Value Technology, People, and The Earth

TAKUMA CSR Report 2007

Takuma Co., Ltd.

Takuma will strive for social contribution, corporate value enhancement, long-term corporate development and all stakeholders' satisfaction by yielding goods and services needed and recognized as valuables in society.

The founding spirit of Takuma was

- "Service to the nation through boiler manufacturing"*
- which in present-day language means "contribution to society
- by supplying goods and services that we yield".
- This spirit can also be applied to the concept of Corporate Social Responsibility (CSR)
- that in recent years has become a vital issue for corporate management.
- The management principles of the Takuma group companies
- are all based on the said founding spirit.

Since fiscal 2007, we have renewed the

"Environmental Report" which was previously issued, as the "CSR Report" in order to describe our

The Compliance & CSR Promotion Division, CSR

From April 1, 2006 to March 31, 2007 in principle

In addition, some activities in fiscal 2007 are

Takuma Head Office, Business institutions, Harima

Factory, Kyoto Factory, and some group companies

(Nippon Thermoener Co., Ltd., Takuma Technos

Co., Ltd., Sun Plant Co., Ltd., Takuma Plant Co.,

Ltd., Takuma Engineering Co., Ltd., Takuma System

Control Co., Ltd., Central Conveyor Co., Ltd., Dan • Takuma Technologies Inc., Kankyo Sol-Tech Co., Ltd., KAB Takuma GmbH and Bioener ApS)

Scheduled for October 2008

CSR activities. August 2007

Department

included.

* Service to the nation through boiler manufacturing

It was the mission statement of Takuma, then Takuma Boiler Manufacturing Co., Ltd., founded by Mr. Tsunekichi Takuma, one of the ten great inventors of Japan during the period of Meiji and Taisho (1868-1926).

Editorial Policy

Date of IssuePublisher

Data Collection

Period

Coverage

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We pledge to reinforce our CSR management, aiming to become the top manufacturer in the field of the environment and energy business.



Could you please tell us what Takuma's CSR management is?

Recently, we face various global issues relating to the environment, including climate change and global warming. Takuma has been continually developing and providing technologies such as energy from waste plant, waste treatment and biomass power plants, activities which are closely related to resolving such environmental issues.

We need not repeat the term 'CSR' here, since the Company founder, Tsunekichi Takuma, already advocated 'Kikan Hokoku' (Service to the nation through boiler manufacturing) as the Takuma corporate motto. 'Hokoku' (patriotism) means a corporation that aims to contribute to society; I strongly believe therefore, that the spirit of this motto is exactly the idea of CSR. In addition, our current corporate motto is "Value technology, people, and the earth". Based on the aforementioned old and new corporate mottos, we will set out to become a company that is needed by society, as our corporate philosophy. I believe that the manufacturing products available to contribute to people, the earth and our corporate activities themselves are the CSR management targeted by Takuma. However, the business performance of fiscal 2006 resulted in an operational deficit and we were unable to deliver satisfactory results to our stakeholders. We would therefore like to focus on 'Reinforcement of Business Risk Management' and 'Promotion of Measures for Realizing Corporate Vision' in the CSR management in future.

You announced the '8th Mid-term Management Plan' in April last year. How was the performance of fiscal 2006, which was the first year of this plan?

The 8th mid-term management plan (2006-2008) represents a drastic reform toward the rebirth of Takuma. We established the following two points of "group management" and "selection and concentration" for basic strategy in the new mid-term management plan and set the following three: "promotion of compliance & CSR management", "reinforcement of corporate competence" and "establishment of best business strategy" as priority subjects, aiming to continue to be a leading company in the field of the environment and energy business.

In April, we launched the Compliance & CSR Promotion Division to strengthen our activities in terms of compliance and risk management. In fiscal 2006, I believe that we could also achieve a significant result in terms of organizational as well as substantial aspects.

Regarding business deployment, one of our overseas strategies; plant business in Europe, which has been introduced in the Corporate Vision section, started to get underway. The order receipt of waste-to-energy power business in England is one of the examples of the project. (For further details, please refer to page 13.) The order volume was relatively high and I sense positive responses toward such projects.

Please tell us about the newly established corporate structure.

During the implementing of organizational change, I held a company-wide gathering to convey my message directly to each employee. That is because it is necessary to share the common acknowledgement of each employee in order to overcome the severe business environment.

The purpose of implementing organizational change is to continue constantly providing products and technologies that maintain customer satisfaction, while thoroughly controlling any risks and securing stable revenue. Our employees have just started to steadily address a new approach under the new corporate structure.

Please comment regarding the announcement of the 'Compliance Declaration'.

Unfortunately, we faced a case last year where we were accused of a legal violation and caused trouble to many people. Although compliance generally means observing laws or ordinances, our group also considers it to encompass the concept of ethics and morality from a broader perspective.

The attitude of "Be faithful" is compliance itself. Since I felt that it was necessary to clearly state my intention as CEO first, I announced the 'Compliance Declaration'.

Please tell us about the participation in the UN Global Compact.

We announced the participation in the 'UN Global Compact', in order to recognize the 'Compliance Declaration', not merely as text written on the face of a document but to appeal, both at home and abroad. The approaches towards issues in terms of 'Human Rights', 'Labour', 'Environment' and 'Anti-Corruption', as advocated by the United Nations, clarify corporate responsibilities and encourage our sustainable growth.

To profit by using illegal measures can never be accepted by society. This is a universal rec-ognition. We will also respect it in our overseas business projects.

I hope to obtain understanding concerning our corporate stance. (Please refer to page 24 as for the UN Global Compact.)

MESSAGE



What do you think of future environmental issues?

It has been two years since the Kyoto Protocol came into force. We face difficult circumstances to achieve the goal of reducing CO_2 emissions during the appointed term. Nevertheless, our products are highly capable of this CO_2 reduction and further-more, meeting social needs both at home and overseas in the field of the environment and energy to establish a society toward environmental preservation and a recycling-oriented society.

It would be such an honor if Takuma's technologies and product lineups could lead to environmental and energy issues being resolved.

Please say a few words to the readers of this CSR Report.

It would be a great pleasure if this CSR Report could help you understand our efforts. I would appreciate your feedback to help us in the further advancement of the company.

August 2007 Takuma Co., Ltd.

Hajime Tejima President and CEO

For the Sake of the Global Environment and Energy **Changing Times and Takuma's Technology** Social Situation of Japan Although progress with the postwar reconstruction was very slow, since the 1950 commotion in Korea fuelled demand for special procurement, our national mining and Takuma has always been creating energy, supporting industry as well as manufacturing production rapidly recovered to enter a period of high economic growth. A shift in fuel was also the latest technology, capable of enhancing people's affluent lives and saving promoted from coal to oil and boilers became increasingly the environment, while also looking ahead of the present to the future. diversified. Social Situation of Japan Social Situation of Japan The postwar depression following World War I and the The Japanese state of technology, centering on the mechanical industry, remained low right after the long Great Kanto Earthquake became the so-called Great national isolation policy and in terms of domestic boilers, Depression and with its economic situation facing a rough copies of foreign products only emerged serious crisis, Japan was going into the Sino-Japanese and sporadically. Pacific Wars in search of new opportunities on the continent. Under the policy of prioritizing military demand, the industrial world expanded to establish production facilities, which was the primary catalyst for the increased demand for boilers. **Early Showa** Meiji to Taisho Postwar period to the Periods Reconstruction **Pacific War** 1868-1926 1945-1960 1926-1945 **Takuma's Activities Takuma's Activities Takuma's Activities** Acclaimed for the high quality of the "Takuma boiler", which Hardware Hardware was superior to foreign-made products, as well as its In 1910, the founder of the company, Tsunekichi Takuma, actual performance, Tsunekichi Takuma was commended In 1949, the Company exported a bagasse firing boiler, learned about boilers himself, taking the opportunity which used pomace of sugarcane as fuel for the first time by the government as one of the ten great inventors of afforded by the starting sale of the Okamoto boilers, which Japan during the Meiji and Taisho periods (1868-1926). In in postwar history. Subsequently, in 1953, the Company played a role in the motor power of sawmill machines. In 1938, Tsunekichi Takuma founded Takuma Boiler developed and delivered the first waste heat recovery 1912, he introduced the first Takuma boiler that he himself Manufacturing Co., Ltd., with the spirit of "service to the boiler, using high-temperature effluent gas emitted from various plants, ahead of the rest of the industry. In 1959, had designed. nation through boiler manufacturing", which reflected the company's commitment to contribute to society through the Company commenced the manufacture and sale of boilers. This was the beginning of our company. small-scale through-flow boiler. "clavton" via technology introduced from overseas. Hardware The Company manufactured and sold lime fuel boilers for small- and medium-sized industries and marine boilers designed in-house.

Social Situation of Japan

Thanks to technical innovation enabled through the introduction of overseas technologies, people's living standards have been enhanced. The concentration of urban population from those who were formerly in the farming community has increased, meaning improved infrastructure and environment have become critical issues. In addition, the rapid development of heavy and chemical industry has generated significant industrial pollution.

> Rapid Growth and Pollution Issues 1960's

Takuma's Activities

Hardware

Takuma has developed into a custom-made plant manufacturer, which designs plants freely to meet customer needs and makes a wide range of product lines available, including compact package boilers, as well as medium- and large-scale boilers by proactively introducing overseas technologies. There have been active product exports to foreign countries and we also exported wood waste boilers for the first time during this period.

Environmental Facilities

In order to hygienically treat waste levels which have risen with the advent of the mass-consumption society, the Company started developing modern waste incineration facilities designed in-house and in 1961, delivered a continuous waste incineration plant to Osaka City as a nationwide first. Moreover, in 1965, Takuma also delivered the first waste incinerator for treating solid industrial waste generated from the automobile industry.

Water Treatment Facilities

The Company rapidly sensed the issue of public water pollution and in 1962, entered the water treatment market by purchasing a water treatment manufacturer, having made deliveries of small-scale sewage treatment equipments and vertical multistage incinerators.

Social Situation of Japan

The energy crises, which hit the country twice, caused significant damage given the national reliance on imported oil and energy at levels of 99% and 75% for overseas supplies respectively. This period saw the economy experience negative growth in real terms for the first time in postwar history and heralded the end of the era of high economic growth. Based on the energy conservation policy, companies have started striving sincerely to rationalize energy consumption and save resources.

Energy Crisis 1970's

Takuma's Activities

Takuma establishes its position as a manufacturer of environmental health devices as well as of boilers, providing a wide range of waste incineration plants and water treatment equipment. In 1972, the Company renamed its company to the present Takuma Co., Ltd.

(Hardware)

In the industrial world, there has been rapidly increasing demand for enhanced energy conservation efficacy through heat recovery. In response, we have delivered numerous waste heat recovery boilers to handle various processes. In 1972, the Company delivered a boiler fuelled by oil palm waste to Malaysia, which saw it highly acclaimed as the world's leading palm firing boiler manufacturer. Takuma also developed a water heater for hot-water supply and air heating for business use called the "Vacotin heater". This heater features a non-bursting risk when the inside of the container is below atmosphere pressure, meaning it can be handled even by individuals who are not licensed boiler engineers. This helped it gain broad market acceptance.

Environmental Facilities

In order to improve the durability of waste incinerator, Takuma developed a bulk waste grinder and built a grinding and sorting plant, which separates combustible from noncombustible waste. This was then applied to valuable resource recovery plant technology in the resource saving movement following the energy crisis. In addition, the Company also delivered a series of industrial waste treatment plants where waste heat boilers were installed, to set a precedent for waste heat recovery plants.

Water Treatment Facilities

Takuma introduced sludge heat treatment technology, capable of substantially reducing sludge moisture, and commenced the sale of the same. The Company constructed a cascade sludge incinerator with boilers, which was designed to provide sludge combustion treatment as a national first.

Social Situation of Japan

Right after the Plaza Accord in 1985, the Japanese yen appreciated swiftly and Japanese speculation accelerated, signalling the start of the bubble era. On the other hand, the appreciation of the Japanese yen invited a decline in machine industry exports, as well as the development of high-tech industry, including communication devices, semiconductors, and computers.

> The Appreciation of the Japanese Yen and the Bubble Economy 1980's

Takuma's Activities

Hardware

Takuma delivered a variety of boilers, including high efficiency and low-pollution coal firing boilers and wideranging solid fuel firing and various waste heat boilers using alternative fuels to oil. The Company has delivered waste heat recovery boilers for marine diesel engines, as well as cogeneration plants that use boilers to recover the heat from gas turbine emissions. Since this period, in response to the demand for energy cost reduction, we have launched an industrial in-house power plant engineering business.

Environmental Facilities

In accordance with the increased volume of urban waste and diversification of its quality, Takuma has developed a series of new combustion equipment and delivered energy from waste plants with waste heat boilers for the waste incinerators nationwide. The Company also has developed ash-melting facilities for volume reduction of incineration ash and rendering substances harmless, of which the initial set was delivered in 1981. Takuma also focused on its industrial waste treatment plant business and commenced the supply of facilities to special waste treatment companies as well as in-house waste treatment within factories.

Water Treatment Facilities

As total control of water quality got underway, Takuma introduced filtration technology, which made continuous treatment available as an advanced form of water treatment technology. We have launched the marketing of the "Uniflo Sand Filter", which is a packaged product featuring the aforementioned technology.

Social Situation of Japan

The burst of the bubble economy triggered a series of bankruptcies of financial institutions and company collapses. Each company promotes the reinforcement and streamlining of management culture, in a fight for survival. At the same time, there has been intensified international awareness of the need to protect the global environment, which has helped popularize the phrase "earth-friendly".

> The Burst of the Bubble Economy and the Beginning of the Heisei Period 1990's

Takuma's Activities

Instilling the phrase "Value technology, people, and the earth", as our company motto, Takuma made it its own mission to generate technologies that contribute to the protection of the global environment.

Hardware

Takuma delivered the first boiler using refuse-derived fuel (RDF) as an alternative to oil. The Company also launched the marketing of cogeneration facilities, which included packaged products of imported gas turbines.

Environmental Facilities

Takuma proactively addressed mechanism elucidation for the generation of dioxins, which are released into the air from waste incineration facilities, as well as developing reduction technology for the same. The Company contributed to establishing such technology and implemented construction of countermeasures to combat dioxins at waste incineration plants nationwide. While constructing grinding and sorting recycling plazas nationwide, the Company also introduced technology in the form of a new and highly efficient municipal solid waste treatment, with low-pollution and recycling efficiency and delivered the pyrolysis gasifying and melting system. As for raw garbage, as well as night soil and sludge, we have introduced biogasification technology, which generates methane gas, used it as fuel, and conducted a demonstration test.

Water Treatment Facilities

Takuma has launched compact and hygienic compost facilities, which allows for the effective utilization of sewage sludge as compost.

Social Situation of Japan

Economic recovery, which uses the market mechanism by introducing the ability of the private sector into the field of public services, has been promoted. Thanks to the rapid spread of the Internet and mobile telephony, globalization has also advanced. The sense of values has become increasingly diversified, amid further progress in price reductions and recovery in the sale of high-value added products. Due to inflating oil prices and in order to control greenhouse effect gas emissions, various technologies, including biomass, the utilization of waste as fuel and that of unused energy have been developed, one after another, and products with such technologies have been launched onto the market.

> Structural Reconstruction and Globalization 2000's-

Takuma's Activities

Aiming to achieve further leaps in the areas of renewable energy and environmental conservation, Takuma promotes the supply of a wide range of technologies for the energy utilization of waste as well as biomass and rendering substances harmless. The Company also promotes the establishment of overseas subsidiaries, developing Takuma's technology worldwide as well as its domestic activities.

Hardware

Takuma has launched the "Micro Turbine Cogeneration Package", which is a packaged product featuring a compact, high efficiency and low-pollution micro turbine and waste heat recovery equipment. The Company also develops an innovative new compact through-flow boiler, which satisfies the requirements of high efficiency, low NOx and low CO.

Environmental Facilities

Takuma delivers a new-generation energy from waste plant, using its unique technology with high efficiency and low environmental load performance. The Company develops and delivers various products, such as plasma melting facilities, which seek to reduce ash volume, render substances harmless and reuse, as well as a highly efficient new dry type exhaust gas treatment system, using a sodium-based chemical.

Water Treatment Facilities

Takuma has commercialized a frozen-concentrated system for the water purification of sludge, using cryogenic thermometry. A verification test of the sewage sludge gasification system, which utilizes fuels by gasifying sewage sludge, is underway.

Company Outline

Company Name:	Takuma Co., Ltd.
lead Office:	2-2-33 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan
ate Established:	June 10, 1938
Representative Director:	Hajime Tejima, President and CEO
Capital:	13,367,457,968 yen (as of March 31, 2007)
lumber of employees:	686 (as of March 31, 2007)
lain Businesses:	Manufacturers of Machinery and Building Contractors
lajor Offices:	Head Office, Osaka Office (Osaka City), Tokyo Office (Chuo Ward, Tokyo),
	Chubu Branch (Nagoya City), Kyushu Branch (Fukuoka City),
	Hokkaido Branch (Sapporo City), Hokuriku Branch (Kanazawa City),
	Tohoku Branch (Sendai City), Taipei Branch (Taiwan),
	London Branch (United Kingdom)
actories:	Harima Factory (Hyogo Prefecture), Kyoto Factory (Kyoto Prefecture)

•ISO-9001 certified: Head Office, Osaka Office, Tokyo Office, other branches in Japan, Harima & Kyoto Factories

●ISO-14001 certified: Harima and Kyoto Factories

 Main Group Companies
Nippon Thermoener Co., Ltd., Takuma Technos Co., Ltd., Hokkaido Sanitary Maintenance Co., Ltd., Takuma Technos Hokkaido Co., Ltd., Sun Plant Co., Ltd., Takuma Plant Co., Ltd., Takuma Engineering Co., Ltd., Takuma System Control Co., Ltd., Central Conveyor Co., Ltd., Dan · Takuma Technologies Inc., Kyoritsu Setsubi Co., Ltd., Kankyo Sol-Tech Co., Ltd., Energy Mate Co., Ltd., New Environmental Energy Co., Ltd., Biopower Katsuta Co., Ltd., Nagaizumi High Trust Co., Ltd., Fujisawa High Trust Co., Ltd., Tochigi High Trust Co., Ltd., Katsuta Co., Ltd., Midac Fujinomiya Co., Ltd., KAB Takuma GmbH (Germany), Bioener ApS (Denmark), Taiden Environtech Co., Ltd. (Taiwan), Siam Takuma Co., Ltd. (Thailand)

• Profit and Loss Summary



Corporate Governance

The Company conducts managerial decision-making concerning important issues as well as the supervision of its business operations at a board of directors. Moreover, we established an executive execution committee, targeting opportunities to deliberate important matters concerning the conduct of affairs. This structure facilitates prompt and appropriate business judgment, as well as enabling business operations to be performed through deliberation by a collegial system at the business performing structure; centering on the President by appointing operating officers. In addition, the Company also has a board of auditors (a total of 3, including 2 external auditors). The Company implemented an organizational change in November 2006 in order to accelerate managerial decision-making, as well as enhancing its functions to meet changes in the business environment and instituted a divisional structure, in which each division is controlled under the direct jurisdiction of the President. With this reorganization, we aim to improve management transparency and health.



To Japan, Asia and Europe

Takuma has been engaged in the design and development of various plants focusing on industrial use, with optimal combustion technology based on boiler technology as well as overall heat energy technology, throughout its history.

The Company aims to provide a wide range of products, including high efficiency and economically effective industrial boiler plants using various fuels and waste heat, industrial waste treatment plants, which are totally systemized from the safety treatment of harmful waste produced by factories to the effective utilization of heat energy and drying/curing plants, which use radiant heat in the course of prepreg manufacture, significantly related to the quality of printed-circuit boards, as well as a cogeneration system, which ensures the simultaneous feeding of heat and power through the utilization of gas turbines. We sincerely hope to contribute to society through the provision of a total energy system, which allows the overall efficiency of input energy to be enhanced via our aforementioned technologies.

The total number of Takuma water-tube boilers delivered (1938-2007)				
Oil/Gas Firing Boilers	1,248 sets of boiler			
Solid Fuel Firing Boilers (biomass)	553 sets of boiler			
Solid Fuel Firing Boilers (coal)	995 sets of boiler			
Solid Fuel Firing Boilers (others)	21 sets of boiler			
Waste Heat Recovery Boilers	392 sets of boiler			
Total	3.209 sets of boiler			

In 1949, Takuma delivered the first biomass firing boiler, since when the Company has been contributing to reduce global CO₂ emissions.

The actual achievement of reducing CO₂ emissions by Takuma's biomass firing boilers 4,712,880tons/year (as of 2007)

The actual achievements of the Solid Fuel Firing Boilers (biomass) by countries





The Overvie

Fuel	Bagasse (left-over fibrous sugarcane)
Fuel Consumption	75,020 kg/h
Number of Boilers	3
Actual Evaporation	170 tons/h
Steam Pressure	47.5 kg/cm ² G (design pressure)
Boiler Efficiency	85.0%



lakuma

CSR Re

Topics

Business Development in Asia

Delivery of a Bagasse Firing Boiler to SURIN SUGAR Co., Ltd (Thailand) and completion of the project

Sugarcane is widely grown in tropical and subtropical regions, with a global production volume of 1.3 billion tons a year. Although sugarcane is used as a raw material for sugar, a left-over fibrous by-product, called bagasse, is generated during the production process, to a volume reaching approximately 200 million tons a year. Although most of such bagasse is currently handled as waste, it has the potential to be used as a valuable biomass resource. If we generated electric power using all 200 million tons of bagasse via a bagasse firing boiler, it would even be possible to generate approximately 5 billion kWh. Takuma has been taking an interest in this unused bagasse and has currently delivered 214 bagasse firing boiler facilities worldwide. In fiscal 2006, we also completed facilities at SURIN SUGAR Co., Ltd. (Thailand).

w	of the	Boiler	Delivered	to	SURIN	SUGAR	Co., Ltd.	
							•	



Business Development in Europe

The First Order Receipt for an Energy from Waste Plant

In 2005, Takuma established a consortium led by our company with ITOCHU CORPORATION and received an order from Lakeside Energy from Waste Plant (EfW), to be the largest of its kind in the country and construction of the plant is currently underway.

The scale of the facility will be approximately 1,400 tons per day with a full turnkey contract, including construction work, scheduled for completion in 2008. This is the first time a Japanese incineration manufacturer has received an order in Europe for the same type of plant.

We can tell that the reason our consortium was selected for this project is thanks to our advanced pollution control system and a safe and economicallyfriendly multidisciplinary engineering ability, as well as the significant track record of around 360 examples of waste incineration plants completed and delivered, both at home and abroad, and even Itochu's business achievements highly acclaimed in Europe.

The U.K., which has been traditionally dependent on direct landfill, focuses on the recycling of waste from the perspective of emphasis on the environment and recycling and this project — is recognized as renewable energy derived power facilities as well as EfW.



Outline of The Plant Full Turnkey Basis Supply : Plant and Civil Equipment



stations and landfill sites. reduces greenhouse gas emissions. UK market.

A Countermeasure against Waste Treatment in the EU

Objective and Policy: The EU waste policy is based on a trio of measures for waste prevention, recovery and heat utilization from waste generated out of necessity as well as the incineration of only redundant waste and landfill. In addition, during the 6th EU Environment Action Programme (instituted in 2001), the approach to waste management involves prioritizing waste prevention and management, the effective utilization of resources, and



The plant under construction of Lakeside Energy from Waste Limited

Business Development in Europe **Second Energy from Waste Plant Order Received**

Takuma and ITOCHU CORPORATION were awarded a full turnkey contract by SITA Cornwall Limited to provide an EfW plant that will process 240.000 tons of waste per annum and generate 16.6 megawatts of electricity. The project forms part of a 30-year private finance initiative (PFI*) contract awarded to SITA Cornwall Limited by Cornwall County Council on 13 October 2006 to deliver an integrated waste management solution for the residents of Cornwall.

The project also represents the second order has received to build an EfW plant in the UK, and follows a contract awarded by Lakeside Energy from Waste Limited in fiscal 2005 to provide a large-scale EfW plant that will process 400,000 tons of waste per annum and generate 32 megawatts of electricity.

The integrated waste management contract awarded to SITA Cornwall Limited has been heralded as a model for future PFI waste management projects in the UK, and will utilise an EfW plant, community recycling centres, waste transfer

Local authorities throughout the UK are currently working to meet targets set under the EU Landfill Directive to reduce the amount of waste sent to landfill. EfW continues to gain attention as a promising alternative to landfill that also

Takuma and ITOCHU CORPORATION are committed to seizing these new opportunities to provide environmentally friendly technological solutions to the

* PFI (Private Finance Initiative)

A new method to perform the construction, maintenance and management of public facilities by utilizing private sector capital, managerial and technical capabilities

the establishment of sustainable consumption behavior. as well as targeting to reduce the quantity of hazardous waste going to final disposal by around 20% of its current level by 2010 and approximately 50% by 2050. (underlying legal system: "Waste Framework Directive (91/156/EEC)", "Council Resolution of 1997 on Waste Policy" and "The Hazardous Waste: Council Directive (94/31/EC)")

Takuma CSR Report Topics

14

Order Receipt of Energy from Waste (RDF) Plant and Biomass Power Plants in Succession

Energy from Waste (RDF*) Plant

KAB Takuma GmbH (Berlin, Germany) — a subsidiary of Takuma — received an order for the construction of an EfW (RDF) for Vattenfall Europe Waste to Energy GmbH of Germany in November 2006.

This facility treats 170,000 tons/year of the RDF generated at a refuse separation plant situated next to the plant, while generating 22MW of electricity, which is then supplied to public distribution lines. The KAB Takuma is responsible for the overall engineering of this plant, whereby the fire grate of the plant, where Takuma's boiler technology is concentrated, adopts a water-cooled system.

* RDF: Refuse Derived Fuel

Fuel rendered to a crayon-like state via additives, including calcium hydroxide, to packed combustible waste generated from offices and households after fracturing, drying and eliminating noncombustible waste



[Rendering]



[External View of the Water-cooled Stoker]

Wood Waste Firing Biomass Power Plant

KAB Takuma GmbH received an order to construct a wood waste firing biomass power plant in December 2006. The facility scheduled for construction is a biomass power plant using 100% woody fuel, including thinned wood and pruned branches, with an area of 140,000m³ generated annually from neighboring forest.

Its treatment capacity is 170,000 tons/year with the capability of 20MW power generation, which is equivalent to the annual electric consumption of 60,000 family units in the neighborhood.

Based on these business achievements, we will continue to significantly contribute to reducing global CO_2 emissions by developing our waste power generation business in Europe.

The Similar Scale Wood Waste Firing Biomass Power Plant Completed in 2005 Photo of the Completed Bischofferode Project

Straw-Fuelled Power Plant

In December 2006, Bioener ApS (Copenhagen, Denmark) — a subsidiary of Takuma Co., Ltd.— received an order for the construction of a boiler plant, featuring a straw-fuelled power plant at the core of the power project and promoted by Vattenfall Denmark A/S.

This project aims to construct a CHP plant*, which maximizes energy efficiency by generating 35.3 MW of electric power and 82 MJ/S of heat, using 200,000 tons of straw annually as fuel, and scheduled for completion in June 2009.

Vattenfall supplies 25% of overall national electricity and the electricity generated from this project will be supplied to respective users as environmentally-friendly electricity while the heat generated will be supplied as steam for home use to local residents.

In Denmark, straw-fuelled power generation and the utilization of heat have been implemented, together with



wind power generation, as one of the countermeasures against environmental and global warming issues and the utilization of renewable energy (biomass and wind power generation, centering on straw fuel) reaches 15% of the overall energy production.

Although Bioener already has a track record of obtaining seven biomass power plants nationwide, the plant for this project is the largest straw-fuelled power plant of its kind worldwide, as well as being globally highly acclaimed as an environmentally-friendly heat and power plant.

> * CHP Plant: Combined Heat and Power Plant A power plantwith both cogeneration and heat supply facilities





Toward the effective utilization of unused biomass energy **Development of the System** of Sewage Sludge Gasification and Power Generation

Takuma's experiences and actual achievements, through its long history of over 50 years, and the considerable technical know-how gleaned from such experiences have significantly contributed to the development of unused "biomass energy".

There is still relative room for improvement in efforts to increase sewage sludge in tandem with the penetration of sewage systems, despite the development of consolidated and advanced infrastructures.

Takuma has been focusing its attention on sewage sludge energy over the last few years and developing a gasification and power generation system, aiming to establish a system that allows reducing volume as well as the effective utilization of sludge energy.

In 2004, our system was adopted by the NEDO (New Energy and Industrial Technology Development Organization of Japan) for their "Demonstration Test for the Utilization of Unused Energy such as Biomass" and in the following year, 2005, Takuma commenced a demonstration test and is currently implementing a test installation with its practical use in mind.



Demonstration Plant



Comparison of power generation from sewage sludge



We instituted the year 2006 as "the first year of the CSR of Takuma", and initially focused on ensuring "thorough compliance with the laws and ordinances", which is the basis of the CSR. In addition, we also established a "Compliance & CSR Promotion Division", appointing a Senior Managing Executive Officer as head of the division since April 1, 2006, aiming to further reinforce corporate social responsibilities as well as promoting enhancements of the guality of management.

Our CSR approach at Takuma

In November 2004, the Company established a CSR Committee and a CSR Promotion and Monitoring Department to address the issues of the compliance and CSR of our company, aiming to reinforce both areas. In the 8th Mid-term Management Plan started in April 2006, we newly launched a Compliance & CSR Promotion Division as a unit, conducting operations involving the promotion of compliance and CSR management, which is the priority subject. In addition, the Company also officially announced Management Principles and Compliance Declaration in April and May, 2006 respectively, in order to address CSR issues of the Takuma Group in an integrated manner. This has led to completion of a system implementing compliance and CSR activities in order to adopt a more serious stance.

Compliance Declaration

Takuma and its group companies have established our management principles to strive for social contribution, corporate value enhancement, long-term corporate development and all stakeholders' satisfaction by yielding goods and services needed and recognized as valuables in society.

However, even though we provide good products and services of high quality, if these are produced through antisocial behavior, the existence of the company would never be socially accepted. We believe that the code of conduct - based on which our group companies will sustainably live in harmony with society - is compliance.

Although compliance generally means to observe laws or ordinance, our group considers, it also includes compliance with internal regulations and the concept of ethics and morality in order to address CSR (Corporate Social Responsibility) from a broad perspective.

In accordance with the priority subject of the 8th mid-term management plan, the Takuma group companies newly launched the Compliance & CSR Promotion Division, which represents a further development of our previous CSR Promotion & Auditing Department, in April this year. Based on the initiatives of the aforementioned division, we pledge to further promote the improvement of compliance-related regulations and establishments, bearing in mind that it is absolutely up to individual members to practice such compliance.

I as the chief executive officer hereby declare, together with all directors and employees of our group companies, that we pledge to direct both the organization and individuals toward compliance, based on the concept that the implementation of compliance by individuals forms our corporate principles, eventually leading to our management principles.

May, 2006 Hajime Tejima, President and CEO Takuma Co., Ltd.

The CSR of Takuma



The Origin of the CSR of Takuma

As the definition of "all stakeholders", specified in the Corporate Principles, we added "global environment", in addition to "customers", "employees", "shareholders", "suppliers" and "community". This represents the core business operation of the Takuma Group as "the environment and energy", which directly resonates with the earth unlike ordinary companies.

The Origin of the CSR of Takuma Company Motto: "Value technology, people and the earth"



The Institution of the Takuma Group Ethics Charter

Aiming to further promote the fair and transparent corporate management of the Takuma Group in an integrated manner, Takuma newly instituted the Takuma Group Ethics Charter in June 2006, in addition to the "company motto" (April 1992), the "Takuma Group Code of Conduct" (August 2004), the "Takuma Environmental Policy"

The Takuma Group Ethics Charter

Takuma and the Takuma group companies believe that it is essential for the sound development of the group that all of the directors and employees remain aware of our social responsibilities and the circumstances surrounding us as well as act in response to social ethics complying with applicable related laws and ordinances. Bearing the above in mind, we have established and will promote this ethics charter as our code of conduct, aiming to realize our management principles.

- 1. We shall strive for a proactive social contribution while establishing a harmonious coexistence with the global environment as good corporate citizens
- 1. We shall act in good faith in accordance with sound business custom, while complying with applicable laws and regulations and committing ourselves to fair, transparent and free competition, as well as conducting lawful business activities.
- 1. We shall never have any relationship with antisocial forces or such organizations, which may pose a threat to the social order and security of civil society.
- 1. We shall respect fundamental human rights and never practice discrimination
- 1. We shall strive to provide high quality products and services, based on our advanced technologies, to attain high acclaim and confidence by our customers
- 1. We shall strive to disclose corporate information to shareholders and investors through investor relations (IR) and other activities on a timely and equitable basis.
- 1. We shall strive to protect corporate properties as well as information, while never using either for improprieties or any unjustifiable purpose other than business operation.

Takuma Group Code of Conduct (excerpt):

- 1. Coexistence with the global environment
- 2. Coexistence with international society
- 3. Practice of social contribution activities
- 4. Free competition and fair trade 5. Relationship with politics and
- public administration 6. Policies concerning business
- entertaining and gift-giving 7. Prohibition of involvement in anti-social activities
- 8. Appropriate export and import transaction
- 9. Prohibition of discriminatory actions

(April 2005) and the "Personal Information Protection Policy" (April 2005). This clarified guidelines applicable to all of the directors and employees of the company with public decency, in accordance with the ethics charter, as well as compliance.

- 10. Respect of individuality, personal quality and privacy
- 11. Safe work environment
- 12. Safety of products and services as well as ensuring reliability
- 13. Policies concerning advertising
- 14. Transmission of corporate information
- 15. Prohibition of insider trading
- 16. Management and proper use of corporate properties
- 17. Handling of confidential information
- 18. Intellectual property protection

The Mid-term Management Plan

The Company has been implementing the 8th three-year Mid-term Management Plan since April 2006.

Corporate Vision

- To become a vital component of Japanese society as a leader in renewable energy and environmental protection
- To become the leading company in the Japanese packaged boiler market
- To expand overseas business operations to the same level as those of Japanese operations

The Positioning of this Mid-term Management Plan

The business environment surrounding us is in an extremely severe state due to intensified price-cutting competition, caused by a decrease in public investments, and the escalating price of steel products causing a price increase in various types of materials and equipments. In fiscal 2001, despite the achievement of recording the best gains, it was not necessarily the case that we could respond fully to the changes in the business environment, and ever

since fiscal 2003, when it began to affect our business operation, our business performance either saw the balance enter the red or low-level profitability.

However, in the areas of the environment and energy, social needs toward environmental preservation and a resource recycling-oriented society, both domestic and overseas, will be growing henceforth. In addition, there has been continued firm demand in the area of commercial thermal energy, as well as machinery and equipment. We strive to continue fostering the Takuma Group by keeping reformation in various areas, meeting the changes in the business environment without simply riding on our previous successful experiences.

This mid-term management plan firstly aims to turn declining business performances into a stable surplus, while establishing a foundation for the future long-term development of our company.

Basic Strategy and Priority Subject

We aim to achieve the numerical targets for this mid-term management plan and the subsequent long-term development of our business performance by establishing the following two points of "group management" and "selection and concentration" for basic strategy while setting the three priority subjects of "promotion of compliance & CSR management", "reinforcement of corporate competence" and "establishment of best business strategy".



Basic Strategy

(1) Promotion of Group Management

Takuma has traditionally set out its basic business strategy to maximize group-wide profits through optimization of the Takuma group as a whole, rather than maximizing the profits of Takuma as a single corporation. This mid-term management plan firmly maintains this basic strategy, aiming to further boost efforts toward optimization as well as maximizing profits.



(2) Selection and Concentration

In order to adapt to changes in the business environment, we strive to further promote the selection and concentration of managerial resources. We pledge to implement intensive managerial resource loading while reorganizing our business lines as well as functions among our group and divisions. In addition, we consider M&A to be an effective measure for business expansion, the improvement of profitability, reinforcement of core competency and so on. We will continue to approach M&A activities while making an appropriate assessment of its necessity.

The CSR of Takuma

2 Priority Subject

(1) Promotion of Compliance & CSR Management

Promotion of compliance & CSR management is one of the vital issues for management. We will, therefore, establish a new management organization (Division) aiming to reinforce compliance and risk management as well as enriching internal control and environment-oriented management.



(2) Reinforcement of Corporate Competence

We will strive to reinforce fundamental vitality for business development by maximizing each managerial resource while also reevaluating the human resources, goods, funding and technology, which serve as a foundation for corporate competence.



(3) Best Business Strategy

We pledge to establish and implement piecemeal business strategies that can attain competitive leadership in the market, exercising the core competency of the Takuma group, while responding to changes in the business environment



* 1) VFM: value for money

Report on the CSR Activities in Fiscal 2006

The focus of the CSR activities of the Takuma Group in fiscal 2006 was on "compliance" activities

[2006]

[=•••]	
April 1	Launch of the Compliance & CSR Promotion Division
May 24	Release of the "Compliance Declaration"
	made by the President
June 8	Institution of the Takuma Group Ethics Charter
June 20	Publication of the "Environmental Report 2006"
July 28	Revision of the Takuma Group Code of Conduct
August 1	Operation of the in-house reporting system gets underv
August 17	Distribution of a compliance card
August 31	Launch of the Coordinating Committee
	for Compliance & CSR Promotion
October 23	Provision of the first seminar for the antitrust laws
	(the second seminar was held on November 2)
October 23	Launch of the Compliance Promotion Organization
November 10	Declaration of participation in the UN Global Compact
December 5	Distribution of the Takuma Group Compliance Manual
[2007]	
January 24	Provision of the first in-house seminar by the Complian
	Promotion Organization

(the second seminar was held on February 14)

March 15 Revision of the Takuma Group Code of Conduct

Regarding the violation of the antitrust laws

On June 12, 2006, the Company and its employees were accused by the Osaka District Public Prosecutors Office on suspicion of violating antitrust laws regarding the bidding process for the construction of a night soil treatment facility and were subject to a penalty in the final judgment on March 29, 2007. In addition, on January 16, 2007, we also received a cease and desist order from the Fair Trade Commission.

The aforementioned occasion is extremely regrettable and we sincerely apologize for causing our shareholders, customers and relative parties anxiety and trouble. Taking the facts presented in the indictment and the cease and desist order with the utmost seriousness, we will take certain measures, while accepting the facts behind such a result with sincerity and we intend to strive to restore credibility from various sectors by further implementing thorough compliance and steady performance based on the strong determination of top management.

Participation in the UN Global Compact



On November 10, 2006, the Takuma Group joined the United Nations Global Compact, pledging to adhere to universal principles covering human right, labor right, the environment and anti-Corruption. The Global Compact is a voluntary corporate citizenship initiative proposed by U.N. Secretary-General Kofi Annan in 1999 at the world Economic Forum. Our company practices a social contribution through the active conduct of business in support of the ten principles.

THE GLOBAL COMPACT

The ten principles of the UN Global Compact

- Human Right Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and Principle 2: make sure that they are not complicit in human rights abuses. Labor Standards
- Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4: the elimination of all forms of forced and compulsory labor:
- Principle 5: the effective abolition of child labor; and
- Principle 6: the elimination of discrimination in respect of employment and occupation



eminars relating to the antitrust laws were held twice (on October 23 and November 2) for management layer and relevant managers respectively, and a guest investigator was invited from the Fair Trade Commission. Participants from our company were listening to the lecture and the seminar was meaningful.

In addition, a compliance card and the Takuma Group Compliance Manual were distributed



Takuma Group Compliance Manual



Compliance Card

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CSR Report The CSR of Takuma

Takuma

Internal Control and Response to the Japanese SOX Act

Internal Control

Regarding internal control, the Companies Act enforced in May 2006 requires "the development of systems necessary to ensure that the execution of the duties by the directors complies with the laws and regulations and the articles of incorporation and other systems prescribed by the properness of a Stock Company" and the Company determined this basic policy at the board of directors meeting held in May 2006. The operation and maintenance of internal control is one of the vital company issues and the Takuma Group will also address this issue, working collectively on a group-wide basis to further enhance corporate value, while complying with requests such as "compliance with laws and ordinances" and "ensuring reliability over financial reporting".

Response to the Japanese SOX Act

In order to cope with the Japanese SOX act (financial instrument exchange act), we have established a "Response Commission toward the Japanese SOX Act", appointing the President as its top management and developed a structure in line with the diagram shown below. As for the schedule, we have been preparing to launch the system in April 2008.



Information Security

Information security considered by Takuma

We consider information security as "maintaining an environment in which we can use an information system for our business operations, including information and equipment distributed on the network and/or the network itself, without losing confidentiality, perfectibility and availability". Consequently, we position the information system in question as a significant management asset and organized the Information Security Committee with the aim of protecting it against any risks and operating information appropriately; based on personal, organizational, technical and physical factors. The Information Security Committee has been conducting education and audit on an ongoing basis since the information security policy was launched in December 2002 and has been striving to promote further highly developed information security measures by promptly implementing appropriate revision, in response to the results of such audit as well as events having occurred both within and outside the company.



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2 Information Security Management Structure

Our information security management is conducted at the initiative of the Information Security Committee, which is organized under the direct rule of the president.

(1) Information Security Committee

The Information Security Committee is a decision-making body, while conducting planning and promotion in terms of information security management. In addition, all members of the committee, including the chairman and vicechairman, are general managers responsible for each office organization, whereby operating officers double up the posts, to facilitate prompt decision-making within committees.

(2) Each Division

Each division conducts its operation through an office organization in response to the instruction from the Information Security Committee, as well as complying with the information security policy, recognizing the significance of the policy.

(3) Department in charge of the information system

The department in charge of the information system implements concrete measures based on the measures determined by the Information Security Committee. Takuma

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3 Our Approaches toward the Information Security

(1) Approaches that we have implemented along the way

① Personal and organizational measures

- Establishment of the Information Security Committee and periodical organization of the same
- Formulation of information security policy
- Implementation of a periodical information security education program for all members
- Implementation of an information security education program for new employees
- Implementation of information security education program for people forwarding emails
- Implementation of an information security audit
- Giving warning to violators based on each access log

(2) Technical and physical measures

- Installation of firewalls on all contact points on the company internal and external network
- Adoption of computer antivirus software and automatic updating of definition files
- Automatic neutralization of viruses in incoming and outgoing mails
- · Introduction of a certification system and establishment of an application system for remote access users
- Protection measures against information leakage from computers taken out of the company by installing an encryption tool
- · Standardization of various security measures via the standardization of the specifications of personal computers used within the company
- Introduction of an automatic application system for the client OS security patch
- · Saving of all incoming and outgoing mails as well as Web access logs

- Introduction of a biometric recognition system for entering the server room
- · Introduction of a video surveillance system at the server room
- Installation of fire extinguishing equipment and a constant-voltage device at the server room

(2) Approaches we plan to implement in future

(1) Personal and organizational measures

- Implementation and strengthening of the information security audit in order to develop internal control
- Provision of continuous periodic education with the aim of establishing awareness of information security
- · Implementation of revision as well as document management for various procedure manuals as part of IT control
- Revision of the information security policy as well as expanding the scope of security to the group companies
- · Formulation of a business continuity plan

2 Technical and physical measures

- Clarification of access authority via user licensing and complete control of authority
- Deterrence of rigging by obtaining logs for PC operations for all users as well as ensuring tracking capability in the case of contingency
- · Access inhibited to the website of certain group companies by introducing WEB filtering
- · Enhancement of the business continuity plan by improving data backup
- Environmental arrangement in order to send emails securely addressed to external companies

Actual Achievements in fiscal 2005 & 2006

Contents	Object persons	Method	Fiscal 2005	Fiscal 2006
Education	All members	e-learning	Approx. 850 participants	Approx. 850 participants
Education	New employees	e-learning	Approx. 15 participants	Approx. 50 participants
Accreditation	People forwarding emails	e-learning	None	Approx. 100 passers
Audit	By sampling	Visiting audit	Approx. 30 departments	Approx. 25 departments

Protection of Intellectual Property

Since November 2006, the management of intellectual property has been conducted by the newly established Planning Center of the Engineering Division with the aim of strengthening and promoting intellectual property strategies integrally with the Operating Department. The Planning

Patent Management

The Company proactively encourages the filing of patent applications, applying for an average of around 50 to 100 cases per year. With this in mind, we have control over the rights and retention of such cases after patent applications, in order to achieve a balance with costs.

We conduct sufficient information exchange with a patent agency, while also thoroughly familiarizing employees with the knowledge and rules regarding intellectual property.

As for the regulations for handling inventions, the revision of the Patent Act means it has been revised in a timely manner and on April 1, 2006, it was also significantly revised. When the Company inherits patent rights related to an employee's invention, the Company pays the employee compensation as a financial incentive for patent application. In addition, where the applied invention is registered, the Company also pays the employee compensation as rewards for the registration.

The compensation, which is based on the achievements for implementing patent rights, is evaluated and accredited at the Invention Council based on applications from employees, including the immediate manager and the

License Management

The Planning Center is engaged in domestic and international license management, as well as conducting the latest foreign-intelligence collection and investigation.

Examples of licensing-in				
Technology	Licensors			
Biological Anaerobic Treatment Plants for Solid Waste	W. Schmid AG (Switzerland)			
Biomembrat System	Wehrle-Werk AG (Germany)			
Regenerative Thermal Oxidizer	Durr Systems, Inc. (U.S.A.)			

Other Intellectual Property Management

Trade secrets of technical know-how are given as an example of intellectual property other than the aforementioned cases. The Planning Center thoroughly familiarizes employees with knowledge and rules as part of CSR management in a timely manner. In the last fiscal year, we compiled a booklet: "Regarding management of technical know-how", which was distributed to relevant divisions and

The CSR of Takuma



Center promotes the reinforcement of intellectual property activities, including patents and technical know-how, while also promoting the reinforcement of management, such as possessions of patents, examining the balance with costs and preventing the leakage of know-how.

relevant inventor him/herself, and is paid to relevant individuals.



Number of cases for patent registrations

Prime examples of licensing-in as well as licensing-out are shown below.

Examples of licensing-out

Technology	Licensees
N-type Palm Wastes	P.T. Super Andalas Steel
Fired Water Tube Boiler	(Indonesia)
Vacotin Heater	Kyungdong Navien (Korea)
Absorption Chiller	Kyungdong Navien
Heater	(Korea)

departments in order to thoroughly implement the appropriate management of significant technological knowhow; namely intellectual property. We particularly focus on the succession and strengthening of technical capabilities, along with reinforcing the management to prevent the leakage of technical know-how.

The CSR of Takuma

Along with All Stakeholders

For the Sake of the Global Environment

 Takuma's Product Line; focusing on the environment and energy

Recycling Plant

Π

 Greenhouse gas emissions by biomass firing boiler power generation, waste incineration power generation, industrial waste power generation A reduction of approx. 5.2 million tons-CO₂/year on a global basis

Since the construction of Japan's first large-scale continuous waste incineration plant in 1963, Takuma has been completed a number of plants, both at home and abroad, for over 40 years. Many of the plants we constructed also include power generation facilities and as of the end of March 2007, 32 plants were engaged in power generation by waste incineration, while 13 plants handled industrial waste incineration domestically. Consequently, we generated a total annual amount of 1,337,800 MWh in fiscal 2006.

As a result, this power generation led to 505,700 tons-CO₂/ year reduction in CO₂ emissions when compared with that generated by thermal and other means of power generation.

When the CO_2 reduction effect by biomass firing boilers (please refer to page 11) is added to the aforementioned result, we have successfully reduced 5,218,580 tons- CO_2 /year on a global basis.



Municipal Solid Waste Incineration and Melting Plant

We generate huge quantities of waste through everyday living, which also includes both harmful and recyclable substances. Takuma treats such waste, using unrivalled technology with a low environmental impact. Takuma has delivered more than 300 plants, both domestically and internationally, since the completion of our continuous waste incineration plant as a national first in 1963. The Company contributes to society in diverse ways, including in hygienic aspects and atmospheric environmental purification, by providing the latest waste treatment technology tailored to contemporary needs and based on extensive actual performances and know-how.



Industrial Waste Incineration Plant

In accordance with industrial advances, a variety of industrial waste has been generated as a byproduct. including a number of substances which are difficult to treat. Takuma solves such problems via advanced technologies and contributes to environmental purification in society via stoker-type incinerator and rotary kiln technologies.



Energy Plant

Takuma provides a variety of energy related facilities, based on the technologies and know-how cultivated as a boiler industry pioneer. We contribute to reducing CO₂ emissions through the use of biomass fuelled power plants, using agroforestry and livestock resources, as well as fuels including gas, oil and coal.



Water Treatment Plant

It can be said that freshwater comprises only 3% of all the water on the planet, of which only 0.01% can be used for living. In order to preserve such precious water, Takuma contributes to global water resource conservation by maintaining a water treatment method via the most appropriate system through a "dialogue with water".

Small-Scale Boiler & Vacuum-Type Hot Water Heater

Not only with large-scale plants but also in the field of general machinery, efficient use of limited resource and energy is an issue we must tackle seriously, from the grass roots to a corporation and state level. The Takuma Group provides products which exert a low environmental burden, based on our long experience in energy utilization technologies and contributing to a reduction in CO2 emissions.

Regenerative Deodorization Equipment

Regenerative deodorization equipment is combustion based deodorization equipment, which introduces a ceramic medium for the recovery/reuse of hightemperature clean gas generated from the treatment of substances and achieving high deodorization efficiency, energy conservation and a low environmental load. It is a system used to minimize emissions of volatile organic compounds (VOC), harmful and odorous substances, via cutting-edge technology. In May 2004, anti-pollution regulations were revised, hence VOC emission control has been underway since April 1, 2006. Our regenerative deodorization equipment is easy to operate and boasts outstanding maintenance capability, best suited for factories requiring a response to VOC control (i.e. factories with painting processes and drying ovens).







Takuma CSR Report

Along with All Stake

For the Sake of the Reduction of CO₂ **Emissions around the World**

Minimum Emission & Maximum Recycle

Conducting Mass-Burn Renaissance — Next-Generation Stoker-Type Waste Incineration Power Plant Production of electricity increased by $20\% \rightarrow CO_2$ generation reduced by 20%

Mass-burn renaissance is a next-generation stoker-type waste incineration power plant, targeting acceptance by future society in terms of all evaluation items, including stable operation, environmental load, overall recycling and installation space and running cost, utilizing comprehensive Takuma technologies.

The next-generation stoker-fired furnace minimizes the environmental load by controlling harmful substances, such as dioxins generated from combustion, as well as maximizing heat recovery and power generation, while retaining the traditional excellent features of a stoker-fired furnace. It is therefore entirely appropriate to label it the next-generation stoker-fired furnace.

- · Excel Stoker, capable of volatilizing and burning waste with a small quantity of primary air
- · Burnout Gas Re-Circulating System, capable of complete combustion with a small quantity of air while controlling NOx
- · Advanced Fuzzy Control System, which conducts highly-responsive combustion control, corresponding to variations in the properties of waste

Thanks to the introduction of these varieties of high combustion technologies, we have achieved stable

combustion by reducing the air quantity by 30% (air ratio 1.3) compared to the traditional quantity. Consequently, we have successfully reduced the volume of exhaust gas emissions by approximately 30%, as well as reducing the amount of harmful substances by combustion, and enhancing the heat recovery efficiency. In addition, we have also enabled minimum emission and maximum recycling via a combination of technologies, including highperformance dry type exhaust gas treatment, lowtemperature heat recovery and low-temperature NOx removal catalyst.

The Company calls this system "mass-burn renaissance" and constructed the first plant of its kind using the same. Furthermore, we have also received a number of commendations for our significant contributions toward environmental conservation and these technologies have currently been introduced in our newly-constructed plants.



Along with Customers

We have been promoting activities involving the collaboration of all employees by setting our quality policy as "manufacturing products meeting customer satisfaction", based on the motto of providing products that give satisfaction while responding to expectations and establishing customer credibility.

Establishment of a QM Committee

The Company has been implementing various approaches in order to improve the quality of products and services



Along with Shareholders

Takuma discloses IR information in accordance with the "Takuma Group Code of Conduct" at all times. We have concerns about easy-to-understand information disclosure classified into "business information", "investor information", "account closing notification" and "stock prices" on our website section "for our shareholders and investors".

Shareholder Composition

(Note 1) Banking companies, life insurance companies casualty insurance companies, securities companies and other financial institutions

Financial and securities

16.4%

companies (Note 1)

Trust and

banking

19.3%

Other corporations

18.7%

companies

Own shares

Foreign

26.6%

Individual

and others

14.5%

corporatio

- Gas turbines



Takuma CSR Report

Along with All Stakehol

duringeach of the processes of sales, design, purchase, production, construction and management, based on the aforementioned policy. However, we consider it necessary to address a company-wide improvement in coordination with each process, in order to further improve the degree of customer satisfaction. With this in mind, in fiscal 2002, we launched a "QM Committee", headed by the management and promoting such activities.

Implementation of a Customer **Satisfaction Survey**

We conduct a customer satisfaction survey for those to whom we made delivery of plant facilities. We continue to strive further, aiming to manufacture products satisfying customers by directly requesting customer opinions regarding products we have delivered in terms of each process (quotation and planning, contract, design, construction, test operation, delivery and overall performance) and further reinforcing the positive points, while promptly making improvements in response to complaints.

Takuma

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Along with Suppliers

In accordance with the "Takuma Group Code of Conduct", the Company strives to ensure the security and reliability of products and services and above all, we ensure the cooperation of suppliers.

Targeting a policy of "manufacturing products meeting customer satisfaction", we consider our suppliers as important partners, in order to contribute to society and we strive to build healthy and long-term stable relationships of trust.

Basic Policy of Procurement Activities

Suppliers are important partners. With this in mind, we consider the significance of building mutual relationship of trust and the need to sustain such relationships. We have specified the following points as our "Purchasing Policy", in order to clarify such ideas:

Purchasing Policy

- 1) Treat all suppliers fairly.
- 2) Seek to discover new manufacturers.
- 3) Always have VA and VE in mind.
- 4) Seek to obtain new related information.
- 5) Strive toward self-development.

Approaches toward Procurement Activities

We provide fair opportunities for new applicant suppliers to enter, regardless of nationality, business size or past record of business deals. The appointment of suppliers is determined by comprehensively evaluating the credibility and stability, in terms of quality, price and delivery time, as well as the capacity for technological development and supply capability. Maintaining long-term stable business deals with excellent companies means improving the credibility of our products, which will therefore enhance our corporate value. For this reason, we aim to strive for the mutual development between our company and suppliers, while establishing relationships of trusts. The Company strives to comply with relative laws and ordinances, as well as social norms based on the principles of compliance management, while also strictly managing and retaining confidential information that we have obtained through business activities. In addition, we also implement study sessions as well as compliance education, with the aim of enhancing awareness and knowledge within the company.

Regarding CSR Procurement

Recently, the time has come to require CSR and green procurement. Green procurement within the company has penetrated for office and stationery supplies, as well as IT related goods and successful results have been obtained. However, in terms of general plant products, we consider that we are yet to achieve our goal. We will promote activities geared toward CSR and green procurement in future.

Furthermore, there are a number of companies which contract for various construction works as our partners and it is vital to ensure safety during construction work. With this view in mind, Takuma has established its own program, the Takuma Construction Occupational Health and Safety Management System (TK \cdot COHSMS) as a constructor. (Please refer to page 37, Policy for Safety and Health)



Along with Employees

CSR Approaches toward Employees [Basic Policy]

The Company considers "establishing a work environment allowing each employee to challenge their goals, as well as getting on with their work through appropriate assessment" to be the basis of employee satisfaction. Specifically, we have been promoting the following approaches:

- Enhance the motivation of employees by ensuring transparency as well as satisfaction in assessment.
- (2) Provide capacity building assistance to employees.
- (3) Improve the work environment, helping employees to address business tasks at ease.

(1) Enhance the motivation of employees by ensuring transparency as well as satisfaction in assessment.

1 Objectives Management System

The Company has been introducing the objectives management system since fiscal 2004, with the aim of enhancing the motivation of employees, while revitalizing internal organization by carefully assessing and fairly treating them, based on capabilities and achievements as well as the degree of contribution exercised in the workplace.

(2) In-House Commendation

Every year, on the company's founding anniversary, the Company provides recognition by the President for the acquirers of invention in terms of patents, PhDs and professional engineering qualifications, as well as those who have carried out long service.

③ Implementation of the Talk Session with the President The Company held an informal gathering for younger employees to have opportunities to discuss with the President more than 20 times, in which younger and midcareer employees, with careers of 3 to 13 years in the company, participated. These meetings helped both parties have the opportunities to exchange mutual opinions directly, such as the younger and mid-career employees expressing problems and questions related to their jobs while the President discussed the future and vision of the company.

(2) Provide capacity building assistance to employees.

① Support for Obtaining Qualifications

The Company provides employees with an incentive to obtain the required qualifications in the course of their work as a result of self-development.

2 Correspondence Education Program

In order to support employees in self-development as well as obtaining qualifications, the Company provides a correspondence education program. This program is available for employees to apply casually at any time and those completing the course can also enjoy a subsidy.

3 Support for an English Education Program

From this fiscal year, the Company launched an in-house TOEIC system and conducts TOEIC work for applicants interested in taking the test.

In addition, the Company also provides support to improve the English capabilities of the employees by holding seminars for English conversation and business writing classes for those employees engaged in overseas operations, in accordance with the active development of overseas business activities.

(3) Improve the work environment, helping employees address business tasks at ease.

Adequate Working Hour Management and Securing Holidays

With the aim of reducing employees' overtime work hours, the Company continues to implement various approaches, including a "No Overtime Day" set for Wednesday, ensuring a reduction in holiday work, as well as promoting the need to take compensatory days off when working on a holiday.

② Approaches toward Health Management and Mental Health

The Company is working in collaboration with our corporate health insurance society, taking preventative measures against metabolic syndrome and mental health. The Company proactively conducts the health management of its employees by providing various activities, including periodical health checkups, diagnosis of lifestyle-related diseases and lifestyle programs, the transmission of information related to health management, as well as the development of a self-examination check

system for mental health In addition, we also implement follow-ups to the periodical health checkups and health consultations by an industrial physician, for employees engaged in a lot of overtime work.



Health Consultation

③ Developing Healthy Employee-Employer Relationships

The labor union is an organization which conducts periodic deliberations and collective negotiations in terms of annual salary, working hour and other working conditions and establishing a stable employee-employer relationship.

Approaches regarding the Recruitment of New Employees

1 Regarding Graduate Recruitment

The Company implements the periodical recruitment of around 15 new graduates every year, from the perspective of long-range outlook and human resource cultivation. As for the recruitment for the next fiscal year, we will continue to implement fairer and more highly transparent recruitment activities via the provision of information, putting ourselves in the students' shoes.

② Implementation of Internship in Recruiting New Graduates

The Company has an internship program, accepting university and technical college students during their school summer breaks.

In fiscal 2006, 4 students participated in the program and experienced research and development work.

3 Regarding the Recruitment of Handicapped People

Currently, 7 handicapped employees are active in the company. (As of March 31, 2007)

We will continue to further strengthen our approaches toward improving the employment rate of handicapped people by proactively participating in job-interview sessions in the local community as well as implementing year-round recruitment.

④ Introduction of a Reemployment System for Senior Citizens

Since fiscal 2006, the Company introduced a reemployment system for those employees having reached the mandatory retirement age and has been providing employees who wish to work actively after retirement with the opportunities to continue playing active roles.

Policy for Safety and Health

Many of our business operations involve plant construction related businesses and in particular, the prevention of workrelated accident is an essential requirement. Acknowledging the need to "respect human life" as the cornerstone, we subscribe to the prevention of work-related accidents at every work site. Our related regulations are based on sincerity and ethics and intended to maintain workers' safety and health and we ensure that all workers and management remain well informed of the same, while representing the Policy for Safety and Health for the pleasant work environment.

Our Policy for Safety and Health

- 1. Safety and health are the basics of our management and take priority over everything else.
- 2. We emphasize that we are bound to follow all laws concerning worker safety and health, along with our own rules concerning them in our daily activities.
- 3. We hold safety oriented practices involving everybody at the construction site so that our safety level will be raised.
- 4. We acknowledge that safety control is risk management, and risk assessment is carried out to monitor this.
- 5. We will educate everyone concerned on the importance of the safety-health issue.
- 6. Adequately implement and utilize the Construction **Occupational Health and Safety Management System.** (TK · COHSMS)

Our Countermeasures against Asbestos

We have formulated our asbestos countermeasure and circulated it within the company. We also hold special classes to educate our employees, related companies and contractors of the risk of asbestos.

Directives regarding Asbestos Products

No asbestos product can be used in any new project. For products already shipped, we propose replacing them with asbestos-free products at the next inspection or repair work opportunity.

Work Rules regarding **Asbestos-Containing Products**

Dismantling, removal or replacement work involving asbestos-containing products should be done in accordance with our work standard "Work details for preventing asbestos exposure".



Special Class on Asbestos

Takuma Construction Occupational Health and Safety Management System (TK · COHSMS)

We have initiated a program called the Takuma Construction Occupational Health and Safety Management System (TK · COHSMS) for the prevention of workplace accidents as well as improvement in worker health and formation of an agreeable workplace, through the joint efforts of the Head Office and the work site.

Conceptual Diagram of the Takuma Construction Occupational Health and Safety Management System (TK · COHSMS)





Takuma CSR Report

Along with All Stakeho

Social Contribution Activities

Contribution to the Local Community

1st Anniversary Project Commemorating the Municipalization of Yatsushiro City "Yatsushiro Kumagawa Festival"

On August 5, 2006, the "Kumagawa Festival" was held to celebrate the 1st anniversary of the Municipalization of the new "Yatsushiro City", due to a municipal merger, in Yatsushiro City, Kumamoto Prefecture. Takuma participated in the project in support of the celebration of the new city.



The 1st Environmental Fair 2006 organized by Anamizu Town, Wajima City

On October 22, 2006, the 1st Environmental Fair was held under the slogan of "Aiming for the recycling society" organized by the Anamizu Sanitary Facility Association of Wajima City in Ishikawa Prefecture. The Company approved the content of this project and cooperated in the fair.



Participation in the "Clean Osaka 2006" —— Cleaning Campaign across the City of Osaka all together

A cleaning campaign across the City of Osaka all together has been implemented in Osaka City since fiscal 1998. In fiscal 2006, the campaign was organized from November 1 to 7. Since Takuma had had its head office based in Osaka City for a relatively long period, we participated in the cleaning event hosted by Osaka City.



Social Contribution Activities conducted by the Head Office

- Summer Festival/Kinrakuji Seinenkai
- Autumn Festival/Kibihiko Shrine Housankai
- Autumn Festival/Kotai Shrine

- Social Contribution Activities conducted by the Harima Factory
- Co-sponsored the Arai Shrine Daikoku Festival
- Co-sponsored the International Exchange Project of the Takasago City Judo Association
- Co-sponsored the "Campaign to make a brighter society"
- Co-sponsored the Takasago City Businessman Sumo Competition

Social Contribution Activities conducted by the Kyoto Factory

• Support for Tonoshiro Kodomokai

Donation of Women's Office Wear as Overseas Relief Supplies

The Company donated the previous women's summer office wear of the head office to an elementary school in Nepal. In order to make effective use of the previous office wear, which were returned to the company in accordance with the switch-over, we received introductions to the NPO Hirakata-Katano International Volunteer Association (HIKIVA), which provides overseas aid, from JAM Hyogo through the Takuma Labor Union to find receiving parties. Our previous office wear was donated to Sathhiwatty college in Nepal through the aforementioned association and made the local people very happy.

* JAM: Japan Association of Metal, Machinery, and Manufacturing Workers

An industrial labor union, comprising 400,000 workers, dealing mainly in the machinery and metal industries



Social Contribution Activities conducted by employees

Sathhiwatty college

the 5th grade

in Nepal: Schoolmaster

(center) and pupils in

1. Youth development through the popularization of karatedo

Mr. Shimamoto of the General Affairs Section of the Harima Factory contributes to the volunteer activity of teaching karatedo in the gymnasiums and elementary and junior high schools in the neighborhood of Takasago City, aiming to foster healthy minds and bodies of youngsters, based on the moral of the karatedo: "sincerity, adamancy and modesty", using his 30-year experience of karate.



2. Teaching kendo at the elementary school PTA Kendo Club

Mr. Tanaka of the Thermal Equipment Design & Engineering Sect., Mechanical Design & Engineering Department participates contributes to the volunteer activity of teaching kendo at the elementary school PTA Kendo Club in Osaka City and participates in volunteer activities, including teaching kendo to elementary school pupils and organization of a kendo tournament.

3. "Hanaippaiya Sakai" (There are a bunch of flowers in Sakai)

Mr. Takahashi of the CSR Department participates in a volunteer activity of flowers. This activity is to create flowerbeds and plant flowers in the public vacant ground, called "Hanaippaiya Sakai". The activity is conducted by volunteers called from each ward of Sakai City (Kita, Higashi, Minami, Nishi and Naka areas), engaging in activities from "hanazukuri (planting flowers)" and "hanakazari (creating flowerbeds)" to "hanamori (looking after flowers, including watering and weeding)".

Contributions through NPOs

Participation in the activities of the NPO Recycling System Center

The Recycling System Center is an incorporated nonprofit organization, established in 1992, with the aim of "an approach toward technologies and a system to promote LCA and DfE related to environmentally aware product making, in addition to the approach toward technologies and a system to reduce environmental load". Takuma supports the Recycling System Center as a key player of the activity.

Message from Mr. Wakamura, Chairman of the organization

In fiscal 2006, we launched a project supporting the creation of new technology and service, contributing to reduce the global environmental load, such as greenhouse gases and waste, while strengthening regional industries. This project implements the construction of demonstration test equipment, as well as trial testing, by formulating a consortium with a combination of local companies, research institutes including universities and nationwide companies. The Recycling System Center, designated as a promotional organization of the project, was established in 1992 whereby organizations such as the Osaka Prefectural Government, Osaka Municipal Government and environmental related companies gathered together and were authorized as an incorporated nonprofit organization in 2002. In fiscal 2006, four projects were thus acknowledged and simultaneously got underway, receiving public assistance.

The actual workforce of the center comprises loaned workers from each company as well as younger consultants. Takuma has been a core member of the center since its establishment, providing continuous support, including the dispatch of engineers to the center over a long period of time.





Participation in the NPO Japan Association for the United Nations World Food Programme as a councilor

The Japan Association for the United Nations World Food Programme aims to contribute to global society in terms of both mental and material aspects of Japanese society by prevailing as well as enlightening the principles and activities of the United Nations World Food Programme, making it its mission to eradicate global starvation while also aspiring to create world peace, in Japan. Despite having enough provisions to feed 6.4 billion people in the world, 852 million people still suffer from hunger and nutritional deficiency. One child under 5 years old dies of hunger every 5 seconds. In poor countries, women and children are left to bear the burden. Meanwhile, we are able to support starving children by providing school meals with 20 ven a dav.

Takuma agrees with the principles of the association and supports them as a corporate member.





Social Contribution Activities

The "Takuma" course in Hokkaido University

2 Previous Activities

and the Issues of a Recycling Society'

"Life Cycle Design for Resource Recycling"

"Strategies and Practices for Creating

"Environmental Policy driven by Citizens"

'How do you treat other plastic waste?'

Environmental Municipalities"

"Aiming for Resource Productivity Improvement"

May 2002

July 2004

June 2005

in Kutchan Town"

Regular Symposia

'The Method of Environmental Impact Assessment with LCA

July 2003 'From the perspective of recycling production'

'Environmental Policy: Partnership and Resources Recycling'

"Creating a Popular-Participation-Type Recycling Society"

"Current Situation of Recycling of 'Other Plastics' in the

Containers and Packaging Recycling Law and its Problems"

"Analysis of the Present State of Collecting other Plastic Waste"

"Approaches toward Containers and Packaging Recycling

Director, Research Center for Life Cycle Assessment, National

Institute of Advanced Industrial Science and Technology

(Currently, Professor of Research into Artifacts, Center

for Engineering, The University of Tokyo)

Associate Professor, Graduate School of

of Engineering, Osaka University)

Engineering, Tokyo Metropolitan University (Currently, Professor of Graduate School

Professor, Graduate School of Energy Science,

Deputy Secretary General, The Coalition of Local

Governments for Environmental Initiative, Japan

Associate Professor, Faculty of Policy Studies,

Professor, Graduate School of Environmental Studies,

Executive Director, Plastic Waste Management Institute

(Currently, Professor of Graduate School of Global Environmental Studies, Sophia University)

Dr. Atsushi Inaba

Dr. Yasushi Umeda

Dr. Keiichi Ishihara

Mr. Naoki Masuhara

Mr. Hideyuki Takahashi

Iwate Prefectural University

Mr. Masaharu Yaqishita

Mr. Hiroshi Katsumata

Dr. Toshihiko Matsuto

Mr. Eiji Nishie

Assistant Professor, Graduate School

of Engineering, Hokkaido University (Currently, Professor of Graduate School of Engineering, Hokkaido University)

Nagoya University

Kyoto University

As a further part of our CSR (corporate social responsibility), Takuma launched an endowed course in Hokkaido University in 2002. It is officially entitled the "Recyclable Resources Assessment (Takuma) Laboratory" (hereinafter referred to as the Hokudai Takuma Laboratory) as part of the "Study of Resource recycling Program" of the graduate school of engineering of Hokkaido University. The Company contributed to this activity for five years, from April 2002 until the end of March 2007.

1 The Outline of the Hokudai Takuma Laboratory

The aim of launching the laboratory involved laying an academic foundation capable of evaluating efficiency, reasonableness and limits from various perspectives, such as resource conservation, environmental load and social acceptability, reflecting the trend of promoting to create a recycling society and treating assets in the form of "recyclable resources" from the discharged material as waste.

As well as research exchange among on-campus related research groups, symposia and extension mini-seminars were proactively organized as part of the research activities in order to ensure exchanges and discussions with a number of people, including municipal officials, general citizens and researchers from other areas of study, while also benefiting from broadly transmitted information, using a class newsletter as well as a website.

The staff members of the laboratory are Prof. Masaru Tanaka (visiting professor at the university, also serving as a professor of the graduate school of Okayama University), Mr. Yoshitada Kakuta (associate professor), and in addition, thanks to the great support of the staff members of the Laboratory of Solid Waste Disposal Engineering, Hokkaido University (Prof. Nobutoshi Tanaka (deceased), Prof. Toshihiko Matsuto. Mr. Yasumasa Toio (instructor) and Mr. Takayuki Matsuo (technical specialist)) and many students, we have been successful in promoting our activities.

The 1st Seminar (June 2002)

"Research and Development Strategies toward a Recycling Society — Necessary Research Project" Dr. Masaru Tanaka, Visiting Professor

The 2nd Seminar (August 2002)

"Considering Waste Tax"

Dr. Masaru Tanaka, Visiting Professor

The 3rd Seminar (December 2002)

"Maintenance of Waste Treatment Facilities by Introducing PFI — what are the problems in the present state?" Dr. Masaru Tanaka, Visiting Professor "After Experiencing PFI Project" Dr. Nobutoshi Tanaka, Professor of Graduate School of Engineering

The 4th Seminar (March 2003)

"The Recent Trends and Social Needs in Waste Related Research"

Dr. Masaru Tanaka, Visiting Professor

The 5th Seminar (July 2003)

"International Cooperation in the Waste Sector" Dr. Masaru Tanaka, Visiting Professor

The 6th Seminar (October 2003) "Consider the Illegal Dumpling Issue" Dr. Masaru Tanaka, Visiting Professor

The 7th Seminar (December 2003)

"Yardstick of the Recycling Society" Dr. Masaru Tanaka, Visiting Professor "Assess the Advantages of Municipal Solid Waste Treatment" Dr. Toshihiko Matsuto, Associate Professor, Graduate School of Engineering

The 8th Seminar (March 2004) Report on the research activities in fiscal 2003

The 9th Seminar (June 2004)

"Intravenous Environment Business Model" Mr. Masafumi Tanaka, Senior Executive Director, **ORIX Eco Services Corporation**

The 10th Seminar (August 2004)

"Strategic Waste Management toward a Recycling Society" Dr. Masaru Tanaka, Visiting Professor

Contribution

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"Problems of Incineration and Generation of Hazardous Chemical Substances in the Process of Plastic Waste Treatment" Mr. Toshikazu Fujiwara

Environmental Department of Kutchan Town, Hokkaido

Secretary-general of Tokyo-area networks for "Stop the dioxin pollution"

"Containers and Packaging Recycling toward Creating a Recycling Society

Mr. Tatsuo Higashi Steering Committee, Kurukuru Network Hokkaido

Extension Mini-Seminars

The 11th Seminar (December 2004)

"Consider the Intravenous Environment Business Model II" Dr. Masaru Tanaka, Visiting Professor "Introduction of Business Examples of Power Generation using Woody Biomass and a Heat Supply System" Yoshitada Kakuta, Special-Appointment Assistant Professor Dr. Yoshitada Kakuta, Associate Professor

The 12th Seminar (March 2005)

"Strategic Management of Medical Waste" Dr. Masaru Tanaka, Visiting Professor

The 13th Seminar (September 2005)

"Illegal Dumpling and Administrative Responsibility" Dr. Masaru Tanaka, Visiting Professor "Handling of Illegal Dumpling by Local Governments - Study of Public Administration with Incrementalism" Mr. Toru Miyamoto, Associate Professor of Hokkaido University Public Policy School

The 14th Seminar (December 2005)

"Consider a Recycling Society with the Key Word 'mottainai'" Dr. Masaru Tanaka, Visiting Professor

The 15th Seminar (March 2006)

"Consider the Intravenous Environment Business Model III" Mr. Yosuke Kiminami, CEO, Recycle One, Inc.

The 16th Seminar (June 2006)

"Consider the Intravenous Environment Business Model IV - Case Study of Waste Recycling" Mr. Takashi Fujii, Mizuho Information & Research

Institute. Inc.



Extension Mini-Semina

3 Having the achievements of our activities published in books

Through five years of research activities, we have been discussing topics such as what we should do toward creating a recycling society and what kind of viewpoints would be important to assess the same with a number of people. In order to make a much wider audience aware of these valuable achievements, we have summarized them into two books as a commemorative publication. The outline of the books is described as follows:

Prescription toward a Recycling Society - Resource Recycling and Waste Management"

(Chuohoki Publishers)

This book is comprised of six chapters and advocates consideration and active actions in broad areas toward creating a recycling society, using keywords such as strategic management, LCA, the acceptability of residents, environmentally aware production, resource productivity, PFI projects, business model, citizen participation, environmental local governments, medical waste, plastic waste recycling and illegal dumpling.

Chapter 1: Strategies toward Creating a Recycling Society Chapter 2: Yardstick of the Recycling Society Chapter 3: Life Cycle Design and Resources

Productivity Improvement Chapter 4: Intravenous Environment Business Model Chapter 5: Environmental Policy and Partnership Chapter 6: Challenges of Waste Treatment

Basic Knowledge of the Evaluation Method

of a Recycling Society" (Gihodo Shuppan) This book allows the reader to learn the evaluation method of recycling from the basics, including the basic concepts of tools, particularly important for evaluating a recycling society and recycling resources, as well as applications, aiming to ensure as large an audience as possible understand the issues.

Chapter 1: What is a recycling society? Chapter 2: Material Flow Analysis Chapter 3: Environmental Impact Assessment (Environmental Assessment) Chapter 4: Risk Assessment Chapter 5: Life Cycle Assessment Chapter 6: Analysis of Costs and Benefits Chapter 7: Environmental Management and Social

Responsibility

We hope these books could be used, by not only specialists and students learning at undergraduate and graduate schools of universities, but also as many people as possible, including local government officials, employers, NPOs/NGOs and general citizens, helping enhance awareness, as well as inducing actions toward global environmental conservation and creating a sustainable society.

After completing the Hokudai Takuma Laboratory

When I look back at these five years following the completion of the Hokudai Takuma Laboratory, I feel compelled to express my thanks once again for the encounters with many people and support I received. Although I feel heartbroken at the sudden and tragic loss of Professor Nobutoshi Tanaka, who performed many services as a caretaker, in March 2005, I thank all the relevant people once again for achieving to complete the laboratory without any troubles. Thank you very much.



Yoshitada Kakuta Former associate professor Graduate School of Engineering, Hokkaido University (Currently, Tokyo Technology Research & Planning Department, Takuma Tokyo Office)



Exhibits

Sewage Works Exhibition '06

The Sewage Works Exhibition '06 was held at the INTEX Osaka, Nanko, Osaka for four days from July 25 through 28, 2006

The Company exhibited in the category of water treatment/advanced treatment equipment and sludge treatment equipment. Real rotary drum thickener machines were exhibited, while exhibiting the Bio Blade Mix and multi module-type Uniflo Sand Filter in the form of a model and a favorable reputation was built up.

The Sewage Works Exhibition is held in Tokyo or a local city on an annual basis and plays an important role in generating awareness of our company technologies. We have received many inquiries about the rotary drum thickener machines exhibited this year, from visitors to the Exhibition.

N-EXPO 2006

With the catch phrase of "Challenges toward environmental revolution, preserving the future of humans and the earth", the N-EXPO 2006 was held from September 7 through 9, 2006 at the INTEX Osaka.

The Company participated in the exhibition, using panels as well as video presentations, with a female navigator, introducing companies which implement industrial waste treatment and woody biomass power generation projects featuring Takuma participation, as well as introducing technologies of woody biomass power plants and biogas recovery plants. Biomass attracted considerable attention and references to Biopower Katsuta Co., Ltd., which has been making good progress since March 2001, while inquiries regarding woody biomass power plants and biogas recovery plants were also noteworthy.



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Environmental Conservation Activities

Basic Environmental Policy

We have publicly announced the following Basic Environmental Policy:

Environmental Philosophy

Takuma is committed to preserving the environment and realizing an affluent society through business activities under the company motto, "Value technology, people, and the earth".

Operational Guidelines

- 1. All Takuma Group companies will recognize the importance of maintaining a balance between preservation of the environment and business activities.
- 2. Continuously develop activities to preserve the environment that comply with applicable environmental laws and ordinances, and ensure environmental control and assessment systems conform to international environmental standards.
- 3. Promote development of improved technologies and products for society that preserve the environment.
- Address resource conservation, energy efficiency, recycling, and minimization of waste generated by all business activities.
- 5. Improve employee awareness and understanding about the importance of preserving the environment through environmental education and internal promotional activities.
- 6. Provide the community with information on the activities of Takuma to preserve the environment.



Both of our factories have acquired the ISO14001 certification and have been conducting environmental management activities, based on the environmental management system established to comply with international standards.

Harima Factory

- Shinhama, Arai-cho, Takasago, Hyogo
- Certification No.: JQA-EM0313 (IS014001: 2004/ JISQ14001: 2004) Certification Date: January 8, 1999 Renewal Date: January 8, 2005 Expiry Date: January 7, 2008
- Certified Business Units: Harima Factory, Research Center Energy & Environmental Technology Division and Experiment Center
- Certified Activities: Design, development and manufacture of boilers and products for environmental plants and issuing of certificates of analyses and measurements
- Group Company: Kankyo Sol-Tech (issuing of certificates of analyses and measurements)

Kyoto Factory

- Kuze Tonoshiro-cho, Minami-ku, Kyoto • Certification No.: JQA-EM0253 (ISO14001:2004/ JISQ14001:2004) Certification Date: November 20, 1998 Renewal Date: November 20, 2004 Expiry Date: November 19, 2007
- · Certified Business Unit: Kyoto Factory
- Certified Activities:
- Design, development and manufacture of small-scale through-flow boilers, vacuum-type water heaters, oil heating-medium boilers, absorption watercooler/heaters and the accessories
- Group Company: Nippon Thermoener (ISO14001 certification of Kyoto Factory has been relegated to Nippon Thermoener Co., Ltd.)

Other Group Companies acquired ISO14001 certification

Takuma Technos Co., Ltd. Dan • Takuma Technologies Inc.

Our Approaches toward the Reduction of the Environmental Load

Environmental Objectives

We have established the following environmental objectives:

- 1. Takuma will reduce the amount of overall energy consumption by 30% compared to its level of fiscal 2001 by fiscal 2012.
- 2. Takuma will reduce the amount of CO₂ emissions by 30% compared to its level of fiscal 2001 by fiscal 2012.
- 3. Takuma will reduce the amount of waste generation by 30% compared to its level of fiscal 2001 by fiscal 2012.
- 4. Takuma will reduce the amount of final disposal of waste by 30% compared to its level of fiscal 2001 by fiscal 2012.
- 5. Takuma will achieve a rate of green purchase, such as office supplies, by more than 60% by fiscal 2012.
- 6. Takuma will take all effective and possible environmental measures by controlling expenditure on the same.

In addition, the Company will newly institute the "Environmental Objectives" as the Takuma Group this fiscal year with the aim of further expanding and developing such activities in relation to the aforementioned "Environmental Objectives", which we have been working on.

Resource Saving & Energy Conservation Campaign

- Followed by the previous fiscal year, the Company implemented the "Cool Biz" campaign as part of the energy conservation measures for summer. Period: June 16, 2006 - September 30, 2006
- Preset Temperature: 28℃ • The Company implemented the "Warm Biz" campaign promoted by the Ministry of the Environment
- Period: December 11, 2006 March 30, 2007 Stoppage of Heater Operation: Heater operation is shut off when the room temperature significantly exceeds 20°C.
- A campaign to reduce photocopying

By using email and other measures, it was possible to reduce photocopying; however, as a result, the number of photocopies made in fiscal 2006 increased by 17% compared to that of fiscal 2005. Consequently, we have started a campaign to reduce photocopying since this fiscal year.

Number of photocopies made in the Takuma Head Office



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<Concrete Objectives>

Although a substantial increase in photocopies is forecast, based on the need to prepare for the Japanese SOX act, we target maintaining the level of fiscal 2006. <Concrete Measures>

- · Reduction in photocopies by using email
- Promoting the use of double-sided photocopies
- · Reduction of making color copies
- Using backing papers

Total Energy Usage

We have compiled the status of total energy usage of the electricity and fuel used at the Harima Factory (including Kankyo Sol-Tech Co., Ltd.), Kyoto Factory and the Head Office. The scope of collected data is the same as that shown in the "Environmental Report 2006" issued the previous fiscal year. In fiscal 2005, the total energy usage was slightly increased; however, in fiscal 2006, we achieved a reduction in the usage level to a level lower than that of fiscal 2004.



■ Amount of CO₂ Emissions

The greenhouse gas emissions created by the Company are only carbon dioxide (CO₂). Since the activities in our factories mainly focus on machine assembly, the environmental load generated by the factories is relatively lower than those of other manufacturing industries. The annual amount of CO₂ emissions from each site are shown in the bar chart below for the past five years. The scope of collected data is the same as the total energy usage.

We have achieved a reduction in the amount of CO_2 emissions to a figure lower than that of the fiscal 2004 level in fiscal 2006, along with the total energy usage.



Note 1: As for the conversion coefficient of each fuel used to calculate the amount of CO: emissions, we adopted the figure from the guidelines issued by the Ministry of the Environment.

Environment. Note 2: The purchased electricity is also included in the calculation, as well as the used fuel. We adopted the conversion coefficient of electricity from the guidelines issued by the Ministry of the Environment.

■ Waste Generation

The Company sells recyclables and reusables from the waste generated through its business activities to scrap dealers, while outsourcing the treatment of the remainder of the waste — non-recyclables and non-reusables — to haulers, processors and final disposal dealers, in accordance with the Industrial Waste Control Manifest system. The amount of waste generation as well as final disposal was found to have increased slightly.

We also adopt the same procedure to control waste in construction sites as that used in the factory. Each of these processes is managed in accordance with the Construction Debris Manifest. The main waste items include noncombustibles and combustibles and we strive to reduce waste generation as well as recycling. In addition, we also have introduced a system to report the record of management activities for individual worksites by checking the electricity consumption.

Water Usage

The applications of water are cooling and rinsing factory equipment, while being used for daily life, cooling water for air-conditioners, watering plants and makeup water for ponds at the Head Office. The water used for these applications is all tap water. At the Harima Factory, its water area is covered by the special measures law for the Seto Inland Sea environmental conservation, whereby stringent emission concentration regulations as well as total volume control are applied. The water quality is regularly checked at each registered drain outlet and the result is reported to Hyogo Prefecture and Takasago City.

Thanks to our efforts to reduce water usage, the level was found to have decreased by 40% compared with that of fiscal 2001.





PRTR Emission

Although our business activities do not involve a wide variety of chemical substances on a massive scale, we use a few designated chemical substances. Consequently, we

O Dichloromethane (CAS No. 75-09-2)

Usage: Rustproofing paint on structural steel for boilers

FY	2003	2004	2005	2006
Emissions(tons)	1.1	0.2	0.2	0

Countermeasures: Since June, 2002, we have been adopting a rustproofing paint without dichloromethane for boilers in series and in fiscal 2006, we have accomplish to reach the amount to zero.

Xylene (CAS No. 1330-20-7)

Usage: Rustproofing paint on structural steel for boilers

FY	2003	2004	2005	2006
Emissions(tons)	0.9	1.3	1.3	1.5

The usage of xylene was increased due to the increase of operational load at the Harima factory.

report and register such chemical substances designated as PRTR, in accordance with relevant laws and ordinances, with the local government.

Toluene (CAS No. 108-88-3)

Usage: Used for chemical analyses inside the analytical laboratory

FY	2003	2004	2005	2006
Transfers(tons)	1.7	1.4	1.6	3.4

After use, all materials are taken away by waste-solvent dealers for disposal.

The usage of toluene in fiscal 2006 was increased due to the increased analyses of the Kankyo Sol-Tech Co., Ltd.

O Benzene (CAS No. 71-43-2)

Usage: Used for painting products at the painting booth within the factory

FY	2003	2004	2005	2006
Emissions(tons)	0.2	0	0	0.1

The coating materials have been changed to the ones with less benzene content since 2004 and we have accomplished to reach the amount of benzene emissions into the environment nearly zero.

Environmental Conservation and Technical Development toward the Efficient Use of Energy

The Company is striving to realize a sustainable society through our business activities; namely technical development, corresponding to contemporary needs. "From the 20th century of prosperity to the 21st century of harmonious coexistence; we wish to pursue technology capable of harmonizing well with nature and coexisting for the true affluence of people and the planet". This is the aspiration of our Takuma Group. In line with this aspiration, we have been promoting technical development, focusing on the environment and energy.

Environmental Purification Technologies

- Combustion residue treatment technology: a technical development whereby incineration ash becomes usable as a civil engineering material by stabilization
- Hazardous waste treatment technology: a technical development used to treat hazardous waste such as asbestos
- Vitrification and slag utilization: a stabilization technical development in order to use liquid slag as a civil engineering material
- Exhaust water treatment technology: a technical development for nitrogen removal in new exhaust water
- High temperature dust collector: a technical development



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for a high temperature dust collector for exhaust gas at temperatures of between 600 - 900 $^\circ\!\!C.$

• Simulation technology: the development of an operational monitoring and control system of waste incineration plants through simulation technology

CO₂ Reduction Technology

- High performance boiler technology: the development of a multitubular small-scale through-flow boiler with high efficiency, low environmental load and low cost
- Biomass gasification technology: the development of high efficiency energy changing technology through a high efficiency biomass gasification process, using wood waste and other materials
- Conversion technology to liquid fuel: the development of methanol synthesis technology from biomass gasification
- Biomass fermentation technology (hydrogen/methane fermentation): the development of hydrogen and methane technology from unused biomass via fermentation
- Carbonization and char utilization technology: the development of carbonization technology of unused biomass as well as that of carbides with commercialization in mind

Environmental Conservation and Technical Development toward the Efficient Use of Energy

Environmental Accounting

Introduction

As our business activities mainly involve the environment and energy, all Takuma group employees have significant awareness of the need for environmental conservation and we have been implementing active and continuous measures with this in mind, ranging from small attention paid by individual employees to significant improvement conducted on a group-wide basis.

Since fiscal 2006, we have introduced Takuma's company-specific environmental accounting system, based on the Environmental Accounting Guidelines 2005 issued by the Ministry of the Environment and striving to quantitatively monitor each numerical figure.

We have been promoting the enhanced understanding of the principles and stance of the Takuma Group, by broadly disclosing our environmental energy-related product information via our website and other means.

Scope of Date Collection

Period: April 1, 2006 - March 31, 2007

Sites : Takuma Head Office, other offices (including overseas offices), Harima Factory, Kyoto Factory, Nippon Thermoener Co., Ltd., Takuma Technos Co., Ltd., Sun Plant Co., Ltd., Takuma Plant Co., Ltd., Takuma Engineering Co., Ltd., Takuma System Control Co., Ltd., Central Conveyor Co., Ltd., Dan · Takuma Technologies Inc., Kankyo Sol-Tech Co., Ltd., KAB Takuma GmbH (Germany), Bioener ApS (Denmark)

Data Collection Method

The data collected on cost is classified by category, as shown below.

Although the business of the Takuma Group itself is related to the environment and energy, the social contribution cost does not include the cost incurred through business activities.

Result Table of the Environmental Accounting

Environmental Conservation Cost

Item	Investment (thousand yen)	Cost (thousand yen)
① Pollution prevention costs	2,028	10,284
② Global environmental conservation costs	82,256	8,663
③ Management activity costs	1,035	36,040
④ Research and development costs	69,083	1,096,708
⑤ Social contribution costs		26,878

Environmental Conservation Effect



Observations by a Third Party

To Mr. Hajime Tejima President and CEO Takuma Co., Ltd.

[Target and Objective of Operations]

Our operations aim to report commendable points as well as those considered to be future tasks for the company from the perspectives of the basic principles of the AA 1000 Assurance Standard (materiality, completeness and responsiveness) concerning whether the "Takuma CSR Report 2007" (hereinafter referred to as the "CSR Report") achieves accountability to stakeholders, commissioned by Takuma Co., Ltd. (hereinafter referred to as the "Takuma"). In addition, this does not intend to assure the accountability of the company.

[Operations implemented]

We assessed the CSR Report through a process focusing on written reviews, as follows:

[Materiality]

As to whether the CSR report includes information regarding their CSR activities, which is necessary for stakeholders to perform decision-making, judgment and action Commendable Points:

Takuma ensures it remains aware of the concerns and interests of stakeholders as far as possible by engaging in communication with the main stakeholders.

- obtained are reported to the QM Committee, headed by management.
- Takuma remains aware of the concerns and interests of their employees by conducting President".
- O Takuma communicates with their suppliers in accordance with the "Purchasing Policy".
- making reports on future business development.

Takuma considers and describes the following issues in terms of processes that specify important aspects.

- basis.
- fact that they implement such issues through their business activities.
- O Takuma considers issues which affect financial affairs in terms of compliance and describes them

Observations by a Third Party

Masako Shishido Representative Partner Social Vision LLC



O Takuma implements a customer satisfaction survey for those to whom they has delivered plant facilities and has an effective grasp of customers' concerns and interests. The issues

communication with all younger and mid-career employees via "talk sessions with the

O Takuma achieves accountability to stakeholders on vital issues, such as compliance and

O Takuma considers issues regarding the Takuma Group Ethics Charter on a group-wide

O As for the issues regarding the UN Global Compact, Takuma considers and describes the

The Points Considered being Future Tasks:

It is hoped that Takuma will consider CSR activities and issues disclosed in the CSR Report of other companies in the same domain in future.

[Completeness]

As to whether Takuma is fully aware of the relevant information concerning important issues to the extent necessary for their business activities

Commendable Points:

Takuma is aware of the impacts on their CSR activities in the following manner and describes them in the CSR Report.

- O Through an ISO 14001 certificate in the Harima and Kyoto factories, the details of their approaches toward the environment on the ground is understood.
- O Takuma sets their own environmental objectives and understands the state of environmental accounting as well as the details of approaches toward the environment. The Points Considered being Future Tasks:

It is hoped that Takuma will describe the issues of CSR activities, including compliance and the approaches toward the environment in each group company, as its scope of the comprehension of impact is intended to expand to a group-wide level in future.

- O There is a wish to specify the scope of comprehension in terms of changes in the number of occupational accidents in the safety and health activities as well as concrete development of the COHSMS in the report.
- O There is a wish to apply Takuma's environmental objectives within the Takuma Group immediately.

[Responsiveness]

As to whether the CSR report responds to significant issues, such as the concerns and interests of stakeholders, as well as it describes in its countermeasures

Commendable Points:

Takuma has established the Compliance & CSR Promotion Division whereby significant issues in terms of compliance, human rights, the satisfaction level of employees and customers, the local community and the global environment are considered and deliberated.

- O Targeting a contribution to the development of bioenergy, Takuma focuses on developing a system of sewage sludge gasification and power generation and implementing trial operations toward practical application.
- Takuma supports educational and research activities by organizing an endowed course at Hokkaido University.
- O Takuma has introduced their environmental approaches through exhibits at the Sewage Works Exhibition 2006 and N-EXPO 2006.
- The CSR Report is disclosed on the website as well as in the form of a booklet.
- \bigcirc Takuma sets out their objectives in terms of CSR by formulating the 8th Mid-term Management Plan, as well as disclosing priority subjects and future development in the CSR Report.

The Points Considered being Future Tasks:

It is hoped that Takuma will disclose the structure of monitoring the CSR progress situation of the group companies.

[Editor's Postscript] After completing the first year of CSR

Nobuyoshi Yamahara Senior Managing Executive Officer General Manager, Compliance & CSR Promotion Division

Fiscal 2006 was the year that we could call "the first year of CSR" for our company. In April 2006, the Compliance & CSR Promotion Division, comprising the CSR, Safety and Legal Departments, was launched. Compliance represents the cornerstone of corporate ethics, while a company scandal threatens to explode into a major event, affecting the survival of the company in the event of failure. At the same time, although the CSR originally enhances stakeholder satisfaction by pursuing corporate social responsibilities, assuming a broad perspective of maintaining and improving corporate social value, compliance can also be said to be included in the CSR.

On this occasion, we have prepared the first issue of the CSR Report 2007. In fiscal 2006, our company suffered a serious incident; however, we have been striving our utmost to implement a variety of activities, as described in this report. Although it was relatively challenging to ensure the concept of CSR penetrated throughout all our employees, I feel that Takuma has been gradually changing and some leads have been taken for the initial year. However, many problems remain to be overcome. We will continue to progress in order to meet the expectations of our stakeholders. Your understanding and cooperation will be greatly appreciated.







• For further information on the CSR Report, please contact:

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