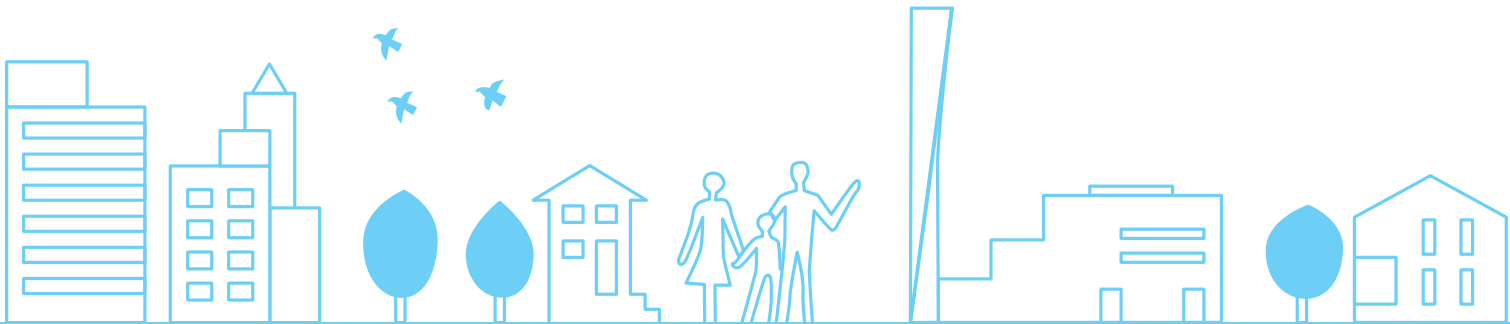
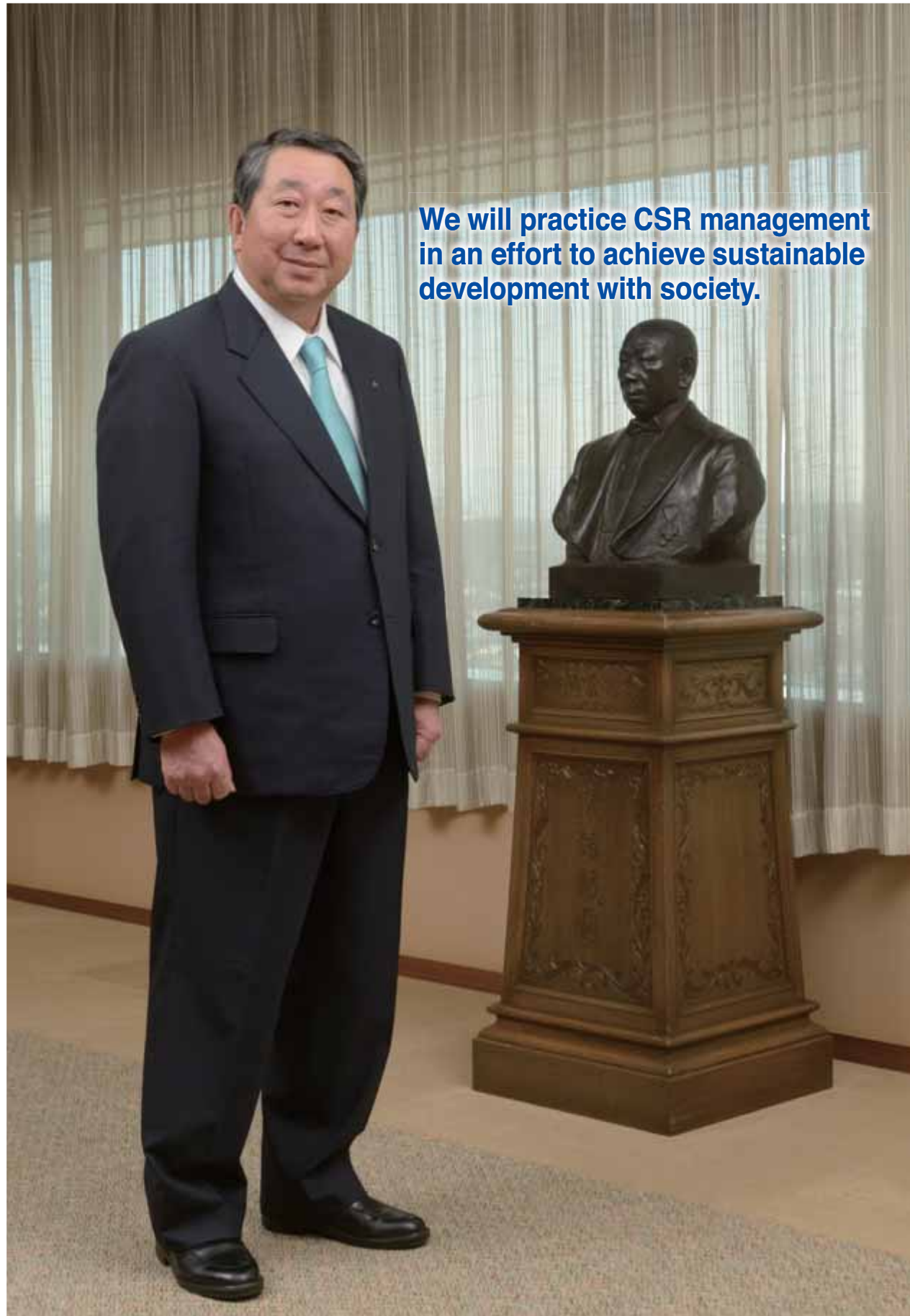


## Corporate Profile & CSR Report 2013



**Value Technology,  
Value People,  
Value the Earth**



**We will practice CSR management in an effort to achieve sustainable development with society.**

I'm Takaaki Kato, and I took over as president and CEO of Takuma in April.

First, I would like to express again my heartfelt sympathy for all those who continue to struggle with the difficult reality of the Great East Japan Earthquake of March 11, 2011. Takuma remains committed to accomplishing as fast a recovery as possible in affected areas by building temporary incinerators for disaster waste and otherwise working to process that waste in an appropriate manner.

The Takuma Group has identified its corporate vision as aiming to maintain its role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection and to achieve an ordinary profit of JPY 10 billion in FY2020. As the first step in realizing this vision, we began implementing our 10<sup>th</sup> Mid-term Management Plan (FY2012 to FY2014) last year.

This plan calls for us to spend three years strengthening the company's financial position so that it is capable of generating stable profits and otherwise preparing for the next increase in profitability. In light of growing expectations concerning use of biomass and untapped energy sources, and we will strive to cement our position and then to pursue new opportunities in this and other promising areas.

## Basic approach to management

I'd like to talk a little bit about my basic approach to management as I take the reins at Takuma.

The first component of my approach consists of getting close to customers and growing together with them. Most of our products, including boilers, garbage treatment plants, and sewage treatment plants, will be used over long periods of time such as 20 or 30 years, during which they will serve as essential infrastructure in the industrial and environmental hygiene fields. Unless we build relationships of trust with customers so that they feel a desire to work together with us as partners, they will not want to entrust us with their projects through the planning, construction, and long-term maintenance stages. It is on trusting relationships with customers that we can build a robust foundation for our business. In addition to sales, technology, and construction departments that come into direct contact with customers through products and services, I consider "neutral" departments such as our general affairs and accounting teams to have an important role in creating trust, and I plan to focus the entire company on building relationships

of trust with customers. Through a core of products and services, companies provide value to customers in a variety of forms, including image, trust, and human resources. It is clear that a company that has a poor image and fails to earn trust will not be able to continue to exist, no matter how exceptional its technology might be. To put it another way, a company can increase its competitiveness in relative terms by increasing this overall value.

The second component of my approach consists of maximizing the potential of individual employees. Companies live and breathe by virtue of the power of their organizations, and those organizations gain strength as the individual employees that support them are able to make full use of their abilities and achieve something that is greater than the sum of its parts. I believe we can enhance the organization's abilities by ensuring that all employees identify with the company's vision and increasing their skills and capabilities. I look forward to creating an environment in which employees can approach their jobs with a sense of ambition, experience motivation and a sense of accomplishment, and make full use of their abilities.

The third component of my approach consists of establishing a growth strategy. First, I see my mission as strengthening the company's financial position so that it is capable of generating stable profits by concentrating on implementing the Mid-term Management Plan put in place by former president Tejima while at the same time establishing a growth strategy in anticipation of the next step forward. The need to use renewable energy sources such as biomass and actively recover energy through waste product power generation will continue to increase as we build the energy society of the future, a society that will not depend excessively on nuclear power or fossil fuels. Takuma has accumulated a stellar portfolio of projects, technologies, and expertise over many years as a leading company in this field. I believe we can expand our operations and achieve new growth by establishing new technologies and services based on these resources, supplying the optimal solutions that customers need, and developing our businesses not only in Japan, but also overseas, particularly in South-east Asia, in an appropriate manner. However, growth is not something you can achieve in a single leap. Just as a seedling adds one growth ring at a time until it becomes a mature tree, I believe our group must focus on making steady progress year after year.

■ Practicing CSR Management

Today, companies have an increasingly diverse and fluid group of stakeholders. Civil society has matured, and its expectations of companies in the areas of the environment and society have reached into the broad domains of product and service quality and business activities. I believe the resulting requirements apply not only to global companies, but also to companies that are active domestically.

The most basic requirement of any company is that it continues to exist. Yet in order for a company to exist and continue to grow, it must respond to the requirements and expectations imposed upon it by society.

I believe that CSR management is required at Takuma to address the following key issues:

- 1. Implementing Takuma's principles
  - Recognition of social and public obligations
  - Accountability and transparency
  - Pursuit of high-quality products and services
  - Continuing innovation
- 2. Addressing issues in key fields
  - Development of products and services in areas such as reduction of CO<sub>2</sub> emissions, energy conservation, and reduction of environmental impacts
- 3. Compliance and risk assessment
  - Thorough compliance
  - Reduction of risk and improvement of profitability through risk assessment

I look forward to your support and encouragement as we focus all of the company's resources on practicing CSR management based on the Company Motto and Management Principles as well as the Takuma Group Ethics Charter and Code of Conduct.

■ In conclusion

Takuma has participated in and supported the principles of the United Nations Global Compact initiative since 2006. And from here on as well, we will continue to develop our business as we tackle the issues of human rights, labor, environment, and anti-corruption.

For a corporation to fulfill its social responsibilities, communication with diverse stakeholders is crucial. I believe that this report will serve as an effective tool for this purpose. Since we wish to give closer attention to your feedback in order to prepare CSR reports that are even easier to understand in the future, we would be very grateful to receive your honest opinions and advice.



June 2013

Takaaki Kato  
President and CEO  
Takuma Co., Ltd.

*Takaaki Kato*

Company Motto    Value Technology, Value People, Value the Earth

Management Principles

**Takuma will strive for social contribution, corporate value enhancement, long-term corporate development and the satisfaction of all stakeholders by providing goods and services that are needed and recognized as valuable 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.

\* Service to the nation through boiler manufacturing  
It was the Company Motto 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).

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 proactive social contribution while establishing a harmonious coexistence with the global environment as good corporate citizens.
- 2. 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.
- 3. We shall never have any relationship with antisocial forces or organizations, which may pose a threat to the social order and security of civil society.
- 4. We shall respect fundamental human rights and never practice discrimination.
- 5. We shall strive to provide high quality products and services, based on our advanced technologies, to attain high acclaim and confidence from our customers.
- 6. We shall strive to disclose corporate information to shareholders and investors through investor relations (IR) and other activities on a timely and equitable basis.
- 7. We shall strive to protect corporate properties as well as information, while never using either for improprieties or any unjustifiable purpose other than normal business operations.

Takuma Group Code of Conduct

|  |   |
|--|---|
| <b>Harmony with society</b> <ul style="list-style-type: none"><li>1. Coexistence with the global environment</li><li>2. Coexistence with international society</li><li>3. Practice of social contribution activities</li></ul>   | <b>Practice of customer satisfaction</b> <ul style="list-style-type: none"><li>12. Safety of products and services as well as ensuring reliability</li><li>13. Policies concerning advertising</li></ul>  |
| <b>Practice of compliance with laws and ordinances as well as sound economic activities</b> <ul style="list-style-type: none"><li>4. Free competition and fair trade</li><li>5. Relationship with politics and public administration</li><li>6. Policies concerning business entertainment and gift-giving</li><li>7. Prohibition of involvement in anti-social activities</li><li>8. Appropriate export and import transactions</li></ul> | <b>Making appropriate disclosure of information</b> <ul style="list-style-type: none"><li>14. Transmission of corporate information</li><li>15. Ensuring reliability of financial report</li><li>16. Prohibition of insider trading</li></ul>                 |
| <b>Respect for basic human rights</b> <ul style="list-style-type: none"><li>9. Prohibition of discriminatory actions</li><li>10. Respect for individuality, personal quality, and privacy</li><li>11. Safe work environment</li></ul>  | <b>Protection of corporate properties and information</b> <ul style="list-style-type: none"><li>17. Management and proper use of corporate properties</li><li>18. Handling of confidential information</li><li>19. Intellectual property protection</li></ul> |



# 10<sup>th</sup> Mid-Term Management Plan – An Overview (FY 2012–2014)

For more information visit <http://www.takuma.co.jp/english/company/plan.html>

## 1. Corporate Vision

**TAKUMA aims to maintain its role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection. Our target is to make an ordinary profit of JPY 10 billion in FY 2020.**

## 2. Policy for the 10<sup>th</sup> Mid-Term Management Plan

### (1) Establishment of a firm business foundation

Establish a firm business foundation in order to assure the certainty of business recovery and sustain stable profitability by: (1) securing personnel by promoting the strategic allocation of human resources in accordance with our business policy, (2) continuation and strengthening of the measures in the 9<sup>th</sup> Mid-Term Management Plan, mainly with development of attractive proposals, cost competitiveness, and quality control, and (3) maintaining and expanding the market share in our core business units as well as the profitability of our maintenance business.

### (2) Preparation for a stage of profit expansion

#### ① Development of Competitive Technologies, Products, and Services

Differentiate from competitors and gain competitive advantages by developing technologies, products and services to meet the expectations of society in the context of great change in market conditions such as the establishment of Japan's Feed-In Tariff Law for Renewable Electricity and energy policy transition. (e.g. reduction of LCC, underutilized energy, high efficiency power generation, low-carbonization, etc.)

#### ② Optimization of Business Scheme within Global Reach

Construct a business scheme optimized for regions and/or clients and corresponding structure to prepare for a full-scale global reach with sufficient market research and risk evaluation, mainly in Asian markets in which increased demand is expected. (e.g. Thailand, Indonesia, Vietnam, China, etc.)

Continue monitoring and researching to consider the possibility of re-entry into European markets.

Proceed with construction of a corresponding structure, including examination and consideration for establishment of local procurement bases, as well as developing suppliers in preparation for increased levels of overseas procurement.

### (3) Transmission of know-how and development of human resources

#### ① Development of Know-How Transmission System

Develop cyclical system to accumulate business know-how, transmitted as “organizational knowledge” and create new knowledge in order to elevate corporate competitiveness.

#### ② Development of Human Resources to Lead the Next Business Expansion

- Form corporate constitution and climate that allow individual personnel to reinforce ability and responsibility and maximize performance.
- Raise personnel with a challenging spirit not to be afraid of making “good mistakes”.
- Raise personnel with designing ability and vitality through OJT.
- Raise personnel with ability to create new knowledge through utilization of inherited business know-how.

### (4) Permeation and establishment of compliance

- Regard compliance as an action to create a sound corporate climate and reinforce its permeation and establishment program throughout the TAKUMA group.
- Hold internal educational activities on a regular basis to provide the opportunity for personnel to reinforce their understanding of relevant rules, regulations and internal policy, primarily with but not limited to the Takuma Group Ethics Charter and Code of Conduct.

## 3. Financial targets

Financial targets in consolidated accounts for the 10<sup>th</sup> Mid-Term Management Plan

- ① Ordinary Profit: **JPY 15.0 Billion** (Accumulated Total of 3 Financial Years)
- ② Ordinary Profit Ratio: **5%** (Accumulated Total of 3 Financial Years)
- ③ Equity Ratio: **35%** (End of FY 2014)

**Lay a Stable Foundation of Revenue Aiming for JPY 10 Billion of Ordinary Profit in FY 2020.**

|                       | 9 <sup>th</sup> Mid-Term Management Plan |         |         | 10 <sup>th</sup> Mid-Term Management Plan          |         |         | FY 2020 |
|-----------------------|--|---------|---------|--|---------|---------|---------|
|                       | FY 2009                                  | FY 2010 | FY 2011 | FY 2012  | FY 2013 | FY 2014 |         |
| Ordinary Profit       | 2,013                                    | 4,396   | 7,336   | Accumulated Total of 3 FYs: above JPY 15.0 Billion |         |         | 10,000  |
| Ordinary Profit Ratio | 2.1%                                     | 4.9%    | 7.3%    | Accumulated Total of 3 FYs: above 5%               |         |         | 7.0%    |
| Equity Ratio          | 23.6%                                    | 23.5%   | 26.2%   | above 35%  |         |         | 40%     |

## 4. Core business units and emphasis of future activities

### (1) Municipal solid waste treatment plant business

#### Business environment

- Existing waste treatment plants are aging.
- Demands of clients have diversified as a result of environmental and electricity supply issues.

#### Emphasis of future activities

- Prolong the lives of existing plants.
- Strengthen the ability to undertake comprehensive evaluation method and DBO.

### (2) Boiler and industrial waste treatment plant business (Japan)

#### Business environment

- Expectations of biomass and underutilized fuels are growing and support from new industrial policy is anticipated.

#### Emphasis of future activities

- Secure and expand orders mainly for boilers fired by special fuels such as RPF, biomass, etc.

### (3) Boiler plant business (Asia)

#### Business environment

- Demand for bagasse boilers in Thailand is increasing.
- Increased demand for biomass boilers outside Thailand is also expected.

#### Emphasis of future activities

- Enrich operational execution functions of local subsidiary (SIAM TAKUMA).
- Develop optimized business scheme in anticipation of business expansion.

### (4) Package boiler business

#### Business environment

- There is a certain level of demand primarily with renewal orders despite the downturn of the market due to its maturity and slump in investments.

#### Emphasis of future activities

- Strengthen efforts to secure renewal orders.
- Strengthen the maintenance business.



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| ■ Editorial Policy  | ■ Data Collection Period   |
| We have prepared this document as a combined Corporate Profile and CSR Report, with both a guide to our corporation and a report on our CSR activities. | From April 1, 2012, to March 31, 2013, in principle. In addition, some activities in FY 2013 are included. |
| ■ Publisher   | ■ Time of Issue:   |
| General Affairs Department, Corporate Service Division  | Current issue: June 2013   |
| CSR Department, Compliance & CSR Promotion Division   | Next issue: scheduled for June 2014  |
| Takuma Co., Ltd.  | Last issue: June 2012  |
| ■ Coverage  |  |
| Takuma Head Office, Business institutions, Harima Factory, and some 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 Engineering Co., Ltd., Takuma System Control Co., Ltd., Dan-Takuma Technologies Inc., Kyoritsu Setsubi Co., Ltd.,           |  |
| Kankyo Sol-Tech Co., Ltd., Takuma Plant Service Co., Ltd.,  |  |
| KAB Takuma GmbH, Bioener ApS, Taiden Environtech Co., Ltd., and SIAM TAKUMA Co., Ltd.   |  |

Corporate Profile

Corporate Information

Business Summary

The Takuma Group Network

# Corporate Information

## Company outline

Company name: TAKUMA CO., LTD.  
Head office location: 2-2-33 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan  
TEL +81-6-6483-2609 FAX +81-6-6483-2751 (operator)  
Representative Director: Takaaki Kato, President and CEO  
Date established: June 10, 1938  
Capital: JPY 13,367,457,968 (as of March 31, 2013)  
Main business areas: Design, construction and superintendence of a wide variety of boilers, plant machinery, pollution prevention plants, environmental equipment plants, and heating and cooling equipment and feed-water/drainage sanitation equipment and facilities  
Design, construction and superintendence of civil, architecture and other works  
Number of employees (non-consolidated): 778 (as of March 31, 2013)  
Number of employees (consolidated): 3,288 (as of March 31, 2013)

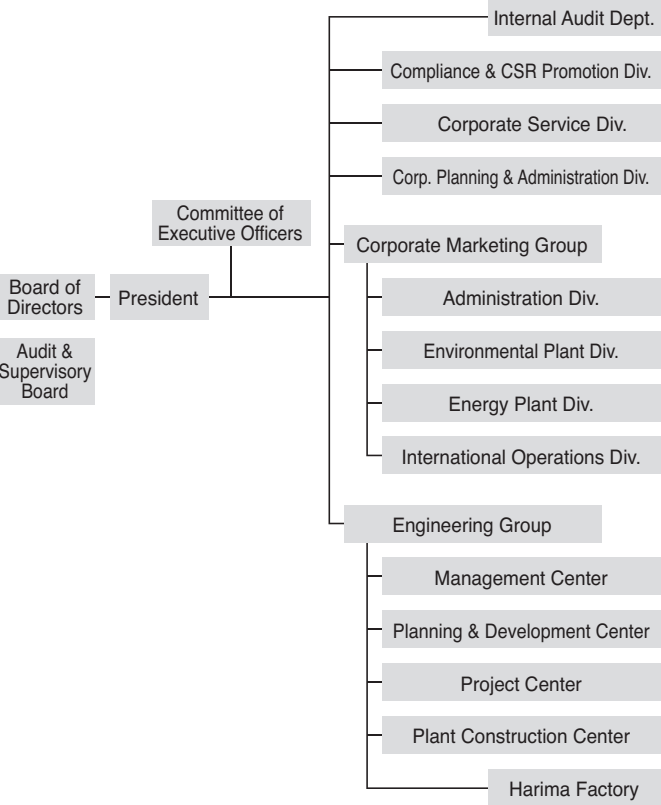
## Permits and registrations

**Head Office, branch offices and other business offices**  
Construction license (Minister of Land, Infrastructure, Transport and Tourism license, Special 22-6129)  
Construction consultant registration (Minister of Land, Infrastructure, Transport and Tourism registration, Construction 21-9335)  
First-class architect office registration (Governor of Hyogo Prefecture, 201793)  
ISO 9001 quality management system certification

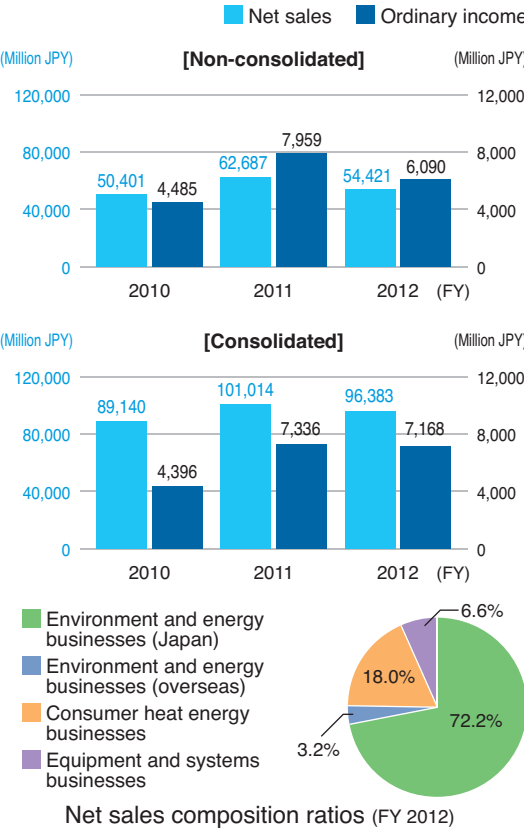
**Harima Factory**  
ISO 9001 quality management system certification  
ISO 14001 environmental management systems certification  
Manufacture of thermal equipment for power generation (Ministry of Economy, Trade and Industry)  
Permission to manufacture boilers and pressure vessels, permission to manufacture cranes (Ministry of Health, Labour and Welfare)  
Certification for the manufacture of boilers and first-class pressure vessels (Nippon Kaiji Kyokai)  
Manufacture of specific high-pressure gas facilities (High Pressure Gas Safety Institute of Japan)



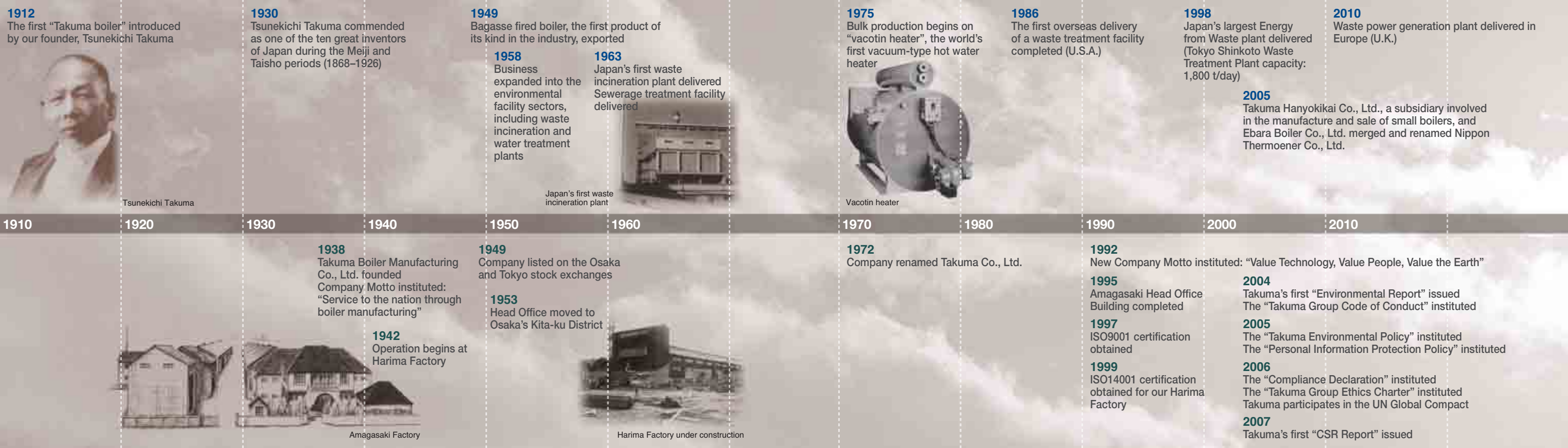
## Corporate structure (as of April 1, 2013)



## Balance sheet overview and net sales composition ratios



## The History of Takuma





## Environmental Technologies

We contribute to society through the recovery of valuable resources and energy as well as the promotion of safe/clean waste treatment.

### ■ Pioneer in waste treatment technologies

Since completion of the first large municipal solid waste treatment facility in Japan in 1963 using its unique proprietary technologies, Takuma has constructed over 340 waste treatment facilities. While pursuing the most efficient incineration, we have striven to develop optimal technologies that match various forms of waste, which change along with the times. It is no exaggeration to say that the history of waste treatment in Japan means the history of advancements in our company's waste treatment technologies.

### ■ Helping prevent global warming with proprietary technologies

As society has focused increasingly on the importance of practicing the 3Rs (Reduce, Reuse and Recycle) in recent years, we have addressed material recycling and thermal recovery of waste in accordance with the third R. Since the general waste people generate in the course of daily life holds a large amount of energy, generating power from such energy helps prevent global warming. We build waste treatment facilities utilizing our unique technologies for incineration, heat recovery, exhaust gas treatment, and wastewater treatment and help prevent global warming through environmental preservation and thermal recovery/power generation.

### ■ Variety of facilities and abundant delivery experience

Takuma has delivered facilities including high-efficiency

waste treatment plants, which perform high-efficiency power generation by creating high-temperature/high-pressure steam; pyrolysis gasification and melting plants, which incinerate pyrolysis gas and carbon generated through thermal decomposition of waste at high temperature to form slag, while generating electricity; ash melting plants, which melt ash left over after incineration of waste to form slag for use in paving roads; recycling plants, which collect iron, aluminum, and glass from waste; and biogas power plants, which extract methane gas from hard-to-burn waste such as kitchen waste to generate power.

In the field of industrial waste treatment, we deliver industrial waste treatment plants, which combine difficult-to-incinerate waste generated during business activities with waste that has a high heat value to treat them safely and recover energy, and hydrogen and methane fermentation plants, which generate hydrogen and methane from food waste and use these outputs as fuels for boilers.

In the field of water treatment, we deliver advanced processing plants to purify treated water at water reclamation centers (sewage plants), and in the field of sludge treatment, we deliver sewage sludge incinerators to control greenhouse gas emissions (N<sub>2</sub>O) during incineration. In particular, we have delivered more advanced processing plants in Japan than any other company.

We have also supplied plants for incinerating waste generated by the Great East Japan Earthquake to Iwate, Miyagi, and Fukushima prefectures as part of an ongoing effort to assist in the region's recovery and reconstruction.

## Energy Technologies

Valuing people and the earth, we promote effective use of diverse energies.

### ■ Utilizing energy technologies to reduce CO<sub>2</sub>

In addition to being a pioneer in boilers, Takuma has a long history of supplying, modifying, and improving incineration technologies to enable customers to utilize a broad range of wastes and biomass.

Energy that serves as a source of heat and power is used in a variety of industries. Not only oil, coal, and natural gas-based fuels, but also various carbon-neutral, renewable energy sources in the form of waste from agriculture, forestry, industry, livestock farming, and other sources as well as waste heat from various plants can all be used effectively. Our technologies for enabling effective use of diverse energy sources help to both secure energy for the future and prevent global warming by reducing CO<sub>2</sub> emissions.

### ■ Actively promoting development of new energy technologies

In recent years, in response to growing anti-global-warming sentiment, we have increased sales of wood chip biomass power plants—an area in which we have extensive experience—while continuing to construct RPF- and animal manure-fueled power plants. All of these facilities take advantage of Japan's feed-in tariff (FIT) program. Aware of the promise of natural gas, which generates significantly lower CO<sub>2</sub> emissions and can help prevent global warming, we are looking at the possibility of using shale gas in the future, and we have delivered natural gas-fueled boilers and gas turbine power plants. We will continue to actively develop new technologies to utilize people- and Earth-friendly energy sources while responding to our customers' needs.

## Value Technology, Value People, Value the Earth

Supporting lifestyles and supporting the environment — at Takuma, with the combustion technologies that are at the core of our business, we have created a variety of technologies in such areas as waste treatment and water treatment, while focusing on people's lifestyles and the global environment.

In order to help solve environmental problems, our desire is to provide new value in the environment and energy fields, including countermeasures for global warming, which is a problem on a planetary scale, and to contribute to the realization of a recycling-oriented society.

### Industrial waste treatment plants

Using advanced incineration technologies, we can even treat toxic substances suitably and we are supporting the environmental protection efforts of industry.

- Industrial waste treatment plant
- Various types of recycling plants



Industrial waste treatment plant



Plant that generates power from industrial waste and provides heat to a plantation

### General-purpose boilers

As the convergence of Takuma combustion technologies, our boilers are a reliable brand that has earned the support of a wide range of industries.

- Once-through boiler (Eqos, Super Eqos)
- Vacuum-type water heater (Vacotin heater)
- Package water-tube boiler
- Smoke tube boiler (RE boiler)
- Heat-transfer oil boiler (thermoheater)
- Radiation heating equipment (strip heater)
- Various equipment for ships

Note: These products are handled by Nippon Thermoener Co., Ltd., which is one of our group companies.



Vacotin heater



Thermoheater



Super Eqos



RE boiler

### Water treatment plants

We are working to purify dirty water with a holistic perspective through a "dialogue with water."

- Sewage and wastewater processing plant
- Various types of advanced sewage processing plants
- Sludge processing plant
- Biogas plant
- Plant to process water that infiltrates final disposal sites



Continuous up-flow sand filter



Purification of park pond water

### Energy plants

Takuma's core technologies are utilized in various types of boilers, starting with biomass fuel boilers, as well as total systems.

- Water tube boiler
- Waste heat recovery boiler
- Biomass fuel boiler
- Power generation plant
- Gas turbine cogeneration plant
- Fluidized bed boiler



Biomass power generation boiler



Gas turbine package

### Municipal solid waste treatment plants

We support the realization of a recycling-oriented society using advanced waste treatment technologies that meet the needs of local communities.

- Energy from Waste plant
- Pyrolysis gasification and melting plant
- Resource recycling and collection plant
- Bulky garbage crushing plant
- Incineration ash and fly ash melting plant
- Waste to solid fuel conversion plant
- Transition and intermediate processing plant
- Raw fuel (biogas) recovery plant
- Various types of pollution prevention equipment



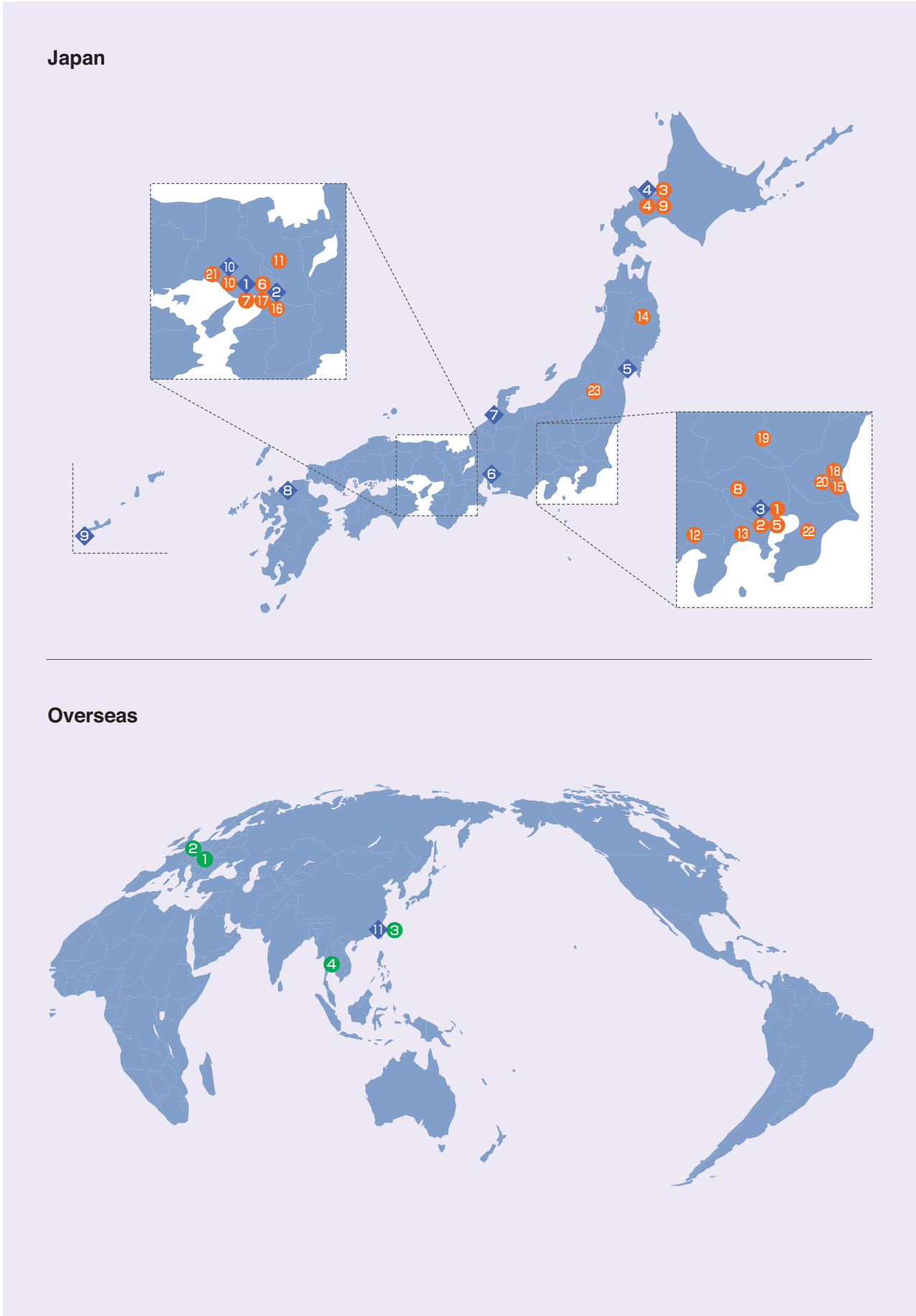
Energy from Waste plant



Resource recycling center



Takuma technology is spreading worldwide.



Takuma's business offices

- ◆ **Head Office**  
2-2-33 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan  
TEL +81-6-6483-2609 FAX +81-6-6483-2751  
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- ◆ **Tokyo Branch**  
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- ◆ **Tohoku Branch**  
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TEL +81-22-222-3042 FAX +81-22-225-6759
- ◆ **Chubu Branch**  
Daitokai Bldg., 3-22-8, Meieki, Nakamura-ku, Nagoya 450-0002, Japan  
TEL +81-52-571-5211 FAX +81-52-581-3005
- ◆ **Hokuriku Branch**  
Asahi Seimei Kanazawa Daini Bldg., 1-2-20 Kohrinbo, Kanazawa, Ishikawa 920-0961, Japan  
TEL +81-76-262-5380 FAX +81-76-263-2394
- ◆ **Kyushu Branch**  
Yakuin Business Garden, 1-1-1 Yakuin, Chuo-ku, Fukuoka 810-0022, Japan  
TEL +81-92-717-2828 FAX +81-92-717-2830
- ◆ **Okinawa Branch**  
1-11-12 Mashiki, Ginowan 901-2224, Japan  
TEL +81-98-898-6650 FAX +81-98-898-6657
- ◆ **Harima Factory**  
1-2-1 Shinhamma, Arai-cho, Takasago 676-8540, Japan  
TEL +81-79-443-6511 FAX +81-79-443-6599
- ◆ **Taipei Branch**  
7F, No.16, Lane 35, Jihu Rd., Neihs District, Taipei 114-92, Taiwan  
TEL +886-2-8752-3838 FAX +886-2-2656-0584

Group companies in Japan

- ① **Nippon Thermoener Co., Ltd.**  
Sales of a wide range of boilers and related equipment  
Shirokanedai Bldg., 3-2-10 Shirokanedai, Minato-ku, Tokyo 108-0071, Japan  
TEL +81-3-6408-8251 FAX +81-3-6408-8278  
<http://www.n-thermo.co.jp/>
- ② **Takuma Technos Co., Ltd.**  
Maintenance, management and operation of waste treatment facilities, excreta processing facilities and other facilities, as well as the design, installation and management of various types of boilers, environmental equipment and other equipment  
10th Chuo Bldg., 1-5-6 Nihonbashi, Chuo-ku, Tokyo 103-0023, Japan  
TEL +81-3-3231-2911 FAX +81-3-3231-2917  
<http://www.takumatechnos.co.jp/>
- ③ **Hokkaido Sanitary Maintenance Co., Ltd.**  
Operation and maintenance of sewage treatment facilities  
Daigo Bldg., 5-11, Ohdori Nishi, Chuo-ku, Sapporo 060-0042, Japan  
TEL +81-11-221-8398 FAX +81-11-221-8542
- ④ **Takuma Technos Hokkaido Co., Ltd.**  
Operation and maintenance of waste treatment facilities  
Daigo Bldg., 5-11, Ohdori Nishi, Chuo-ku, Sapporo 060-0042, Japan
- ⑤ **Sun Plant Co., Ltd.**  
Design, construction and superintendence of air-conditioning equipment, feedwater/drainage sanitation equipment, and electrical equipment  
Nomura Higashi-nihonbashi Bldg., 1-1-7 Higashi-nihonbashi, Chuo-ku, Tokyo 103-0004, Japan  
TEL +81-3-5825-0921 FAX +81-3-5825-1631  
<http://www.sunplant.co.jp/>
- ⑥ **Takuma Engineering Co., Ltd.**  
Design of environmental equipment plants and energy plants  
Takuma Bldg., 2-2-23 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan  
TEL +81-6-6487-4820 FAX +81-6-6487-4829  
<http://www.takuma-eng.co.jp/>
- ⑦ **Takuma System Control Co., Ltd.**  
Design of electrical instrumentation equipment, including environmental equipment plants and energy plants  
Takuma Bldg., 2-2-23 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan  
TEL +81-6-6487-4830 FAX +81-6-6487-4839  
<http://www.takuma-sc.co.jp/>
- ⑧ **Dan-Takuma Technologies Inc.**  
Manufacture and sale of clean equipment, cleaning equipment, chemical filters, clean rooms, drying equipment and thermal chambers  
3-12-16 Iwadokita, Komae, Tokyo 201-0004, Japan  
TEL +81-3-3488-1111 FAX +81-3-3488-1118  
<http://www.dan-net.com/>
- ⑨ **Kyoritsu Setsubi Co., Ltd.**  
Design, construction and superintendence of Energy from Waste plant, mechanical equipment of sewage treatment facilities, and boiler plants for general industries  
5-1-38 Yurigahara, Kita-ku, Sapporo 002-8081, Japan  
TEL +81-11-770-2811 FAX +81-11-770-2822
- ⑩ **Kankyo Sol-Tech Co., Ltd.**  
Analyzing and measurement for environment-related issues, including water quality, exhaust gas and soil pollution  
1-2-1 Shinhamma, Arai-cho, Takasago, Hyogo 676-8540, Japan  
TEL +81-79-443-6508 FAX +81-79-443-6510  
<http://www.k-soltech.co.jp/>
- ⑪ **Campo Recycle Plaza Co., Ltd.**  
Municipal solid waste and industrial waste treatment services  
1 Takayanishitani, Sonobe-cho, Nantan, Kyoto 622-0032, Japan  
TEL +81-771-68-3636 FAX +81-771-68-3639  
<http://www.c-rp.co.jp/>
- ⑫ **Nagaizumi High Trust Co., Ltd.**  
Facility upgrading, operation and maintenance of municipal solid waste final disposal sites  
374-12 Higashino, Nagaizumi-cho, Suntou-gun, Shizuoka 411-0931, Japan  
TEL +81-55-989-2268 FAX +81-55-987-9935  
<http://www.nagaizumi-ht.jp/>
- ⑬ **Fujisawa High Trust Co., Ltd.**  
Operation and maintenance management of municipal solid waste treatment facilities  
2168 Ishikawa, Fujisawa, Kanagawa 252-0815, Japan  
TEL +81-466-45-5411 FAX +81-466-45-5454
- ⑭ **Iwate-Kenpoku Clean Co., Ltd.**  
Industrial and municipal solid waste treatment services  
48-34, Dai 20 Chiwari, Esashika, Kunohe-mura, Kunohe-gun, Iwate 028-6505, Japan  
TEL +81-195-42-4085 FAX +81-195-42-4550  
<http://www.iwate2cln.co.jp/>
- ⑮ **Hitachinaka-Tokai High Trust Co., Ltd.**  
Operation and maintenance management of municipal solid waste treatment facilities  
103-2 Shinkocho, Hitachinaka, Ibaraki 312-0005, Japan  
TEL +81-29-265-5371 FAX +81-29-265-5372

- ⑯ **Energy Mate Co., Ltd.**  
Sale of cogeneration systems and systems for the generation equipment of the same and total service for onsite energy systems for consumer use  
Midosuji Daiwa Bldg., 3-6-8 Kyutaromachi, Chuo-ku, Osaka 541-0056, Japan  
TEL +81-6-6241-6200 FAX +81-6-6241-6210  
<http://www.energy-mate.co.jp/>
- ⑰ **Takuma Plant Service Co., Ltd.**  
Maintenance of a wide variety of boilers and environmental facilities  
2-2-27 Kinrakuji-cho, Amagasaki, Hyogo 660-0806, Japan  
TEL +81-6-6488-8434 FAX +81-6-6488-0300  
<http://www.takuma-ps.com/index.html>
- ⑱ **Biopower Katsuta Co., Ltd.**  
Sale of power generated using biomass energy from wood fuel chips  
1974-1 Koya, Hitachinaka, Ibaraki 312-0002, Japan  
TEL +81-29-270-3341 FAX +81-29-270-3343
- ⑲ **Tochigi High Trust Co., Ltd.**  
Industrial waste treatment services  
18-3 Kinugaoka, Moka, Tochigi 321-4367, Japan  
TEL +81-285-83-3966 FAX +81-285-83-6500  
<http://www.t-hitrust.co.jp/>
- ⑳ **Katsuta Co., Ltd.**  
Industrial waste and municipal solid waste treatment services  
1968-2 Koya, Hitachinaka, Ibaraki 312-0002, Japan  
TEL +81-29-270-3711 FAX +81-29-270-3712  
<http://www.eco-katsuta.com/>
- ㉑ **R.B.N. Co., Ltd.**  
Municipal solid waste, including waste home appliances and office automation equipment, and industrial waste treatment services  
3059-20 Nakajima, Shikama-ku, Himeji, Hyogo 672-8035, Japan  
TEL +81-79-243-1200 FAX +81-79-243-1202
- ㉒ **Ichihara New Energy Co., Ltd.**  
Industrial and municipal solid waste treatment services  
733 Mandano, Ichihara, Chiba 290-0549, Japan  
TEL +81-436-50-8300 FAX +81-436-50-8400  
<http://www.ichihara-new.com/>
- ㉓ **Ecos Yonezawa Co., Ltd.**  
Final disposal of industrial waste  
7028-1 Yanazawa, Yonezawa, Yamagata 992-0077, Japan  
TEL +81-238-39-4050 FAX +81-238-39-4051  
<http://www.ecos-y.co.jp/>

verseas group companies

- ① **KAB Takuma GmbH (Germany)**  
Möllendorffstraße 52 D-10367 Berlin, Germany  
TEL +49-30-5465-0 FAX +49-30-5465-2113
- ② **Bioener ApS (Denmark)**  
Markensvej 50 C, 2. DK-2605 Brøndby, Denmark
- ③ **Taiden Environtech Co., Ltd. (Taiwan)**  
Design, installation and superintendence of waste treatment facilities and a wide variety of industrial machinery and equipment  
7F, No. 16, Lane 35, Jihu Rd., Neihs District, Taipei 114-92, Taiwan  
TEL +886-2-2659-7137 FAX +886-2-2656-0584
- ④ **SIAM TAKUMA Co., Ltd. (Thailand)**  
Sale of energy and environment-related plants, parts sale for plants of the same and after-sales service  
18th Floor, Sinn Sathorn Tower, 77/69 Krungdhonburi Rd., Klongtsonai, Klongsarn, Bangkok 10600, Thailand  
TEL +66-2-4385616 FAX +66-2-4400114

CSR Report 2013

|                                  |
|----------------------------------|
| Business Development             |
| Topics                           |
| CSR Activities for the Future    |
| Corporate Governance             |
| Human Rights and Labor Practices |
| The Environment                  |
| Fair Business Practices          |
| Consumer Issues                  |
| Participation in the Community   |
| Contribution to Society          |
| Outside Expert Opinion           |



# Efforts for DBO Projects

Moving beyond conventional approaches to waste treatment to create facilities that are embraced by their host communities

## I. We give communities peace of mind by following five basic policies.

In recent years, it has become common for local governments to adopt a design, build, and operate (DBO) approach to their garbage treatment facilities. Takuma is actively involved in DBO projects, in which it takes advantage of facility operation expertise born of advanced technological skill and extensive experience.

### Community peace of mind

Satisfaction of local governments' needs  
Building relationships of trust with local residents

#### Safety and stability

- Accommodating a broad range of garbage
- Planning for stable, continuous operation
- Working to lengthen facility lifespans

### Five basic policies

#### Reduce environmental impacts

- Maximizing power generation from waste products
- Minimizing the volume of waste targeted for final disposal
- Implementing robust exhaust gas treatment policies

#### Contribute to the community

- Helping revitalize the local community
- Operating the business in a locally rooted manner
- Serving as a shelter in times of disaster

#### Consider the needs and concerns of surrounding areas

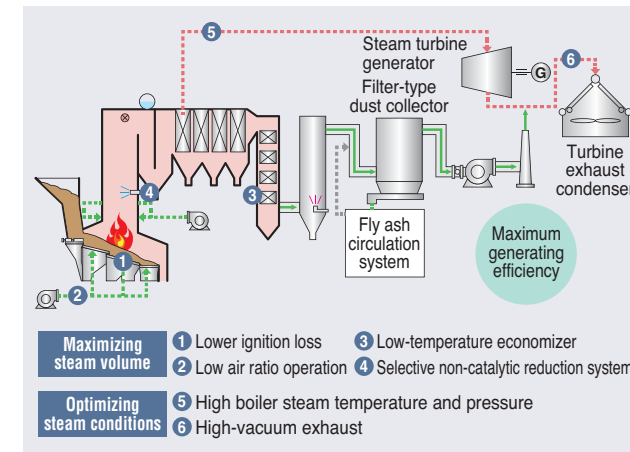
- Designing facilities that blend in with the surrounding environment: Creating a pleasing landscape
- Designing facilities that become symbols of their communities

#### Serve as an environmental learning facility

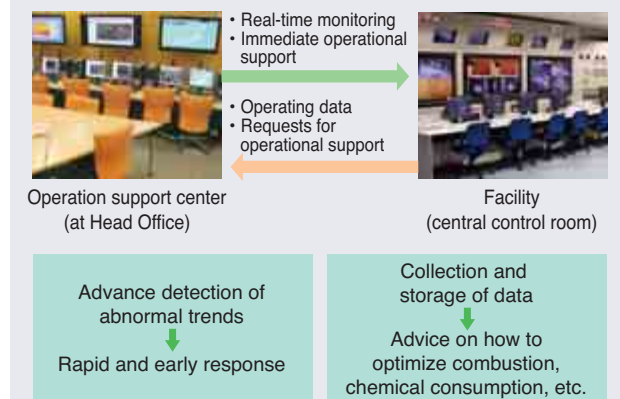
- Disseminating environmental information
- Offering an extensive range of environmental learning programs
- Using diverse environmental learning systems

## II. The Takuma Group possesses the technologies, systems, and expertise required by DBO projects.

### Top-level, high-efficiency power generation using state-of-the-art systems



### Technological network that facilitates high-efficiency operation



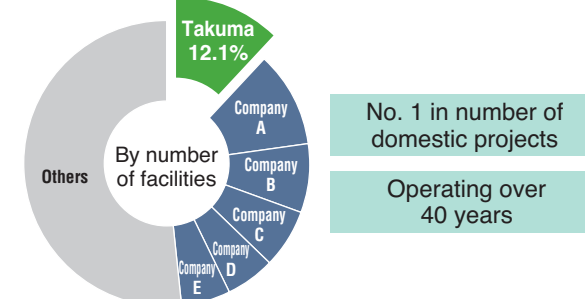
### Coexistence with the community: Project operation that is rooted in the local area



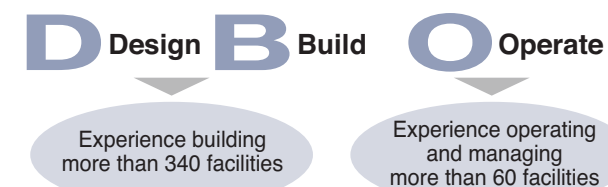
### Diverse environmental learning functions that expand individual residents' environmental awareness



### Extensive track record in construction, operation, and management



Our share of municipal solid waste treatment facilities



#### ■ DBO projects

Design-build-operate (DBO) is an approach to infrastructure projects that shares certain characteristics with private finance initiatives (PFIs). In a DBO project, a public entity secures funding for the construction of a facility and then contracts a private-sector company to do the design and construction work. Then the public entity, which retains ownership of the facility, enters into a long-term contract with a private-sector company for its operation, maintenance, and management.



# Measures for Improving Core Businesses

— Aiming at municipal solid waste treatment facilities that contribute to the formation of a recycling-oriented society

Today, more than half of the municipal solid waste treatment facilities in Japan have been in operation for more than 20 years. The importance of countermeasures to aging that aim at extending service life by preserving function and maintaining quality is increasing every year. In the government's "Basic Plan to Promote Formation of a Recycling-Oriented Society," they have changed the direction of their policy for municipal solid waste treatment facilities from "improving public health and resolving pollution problems" towards placing more weight on the "formation of a recycling-oriented society." Starting from FY2010, they have added a new menu item to their "Subsidies to promote formation of a recycling-oriented society" program: "Support upgrades to primary equipment that contributes to extending the service life of general waste treatment facilities and to the fight against global warming."

Under such global circumstances, a change to measures that target extending the service life of municipal solid waste treatment facilities is being called for. From what used to be only the preservation of function and the maintenance of quality, the need is now shifting toward the consideration of energy conservation activities that contribute to global warming countermeasures and promote the effective use of the energy that is generated during the incineration of waste.

Thanks to its track record of delivering more than 340 facilities, Takuma is able to propose and implement high-precision measures to extend service life based on the maintenance information data we have obtained from those units. By incorporating energy conservation technologies and technologies related to heat use that we have cultivated over many years as a boiler and environmental plant manufacturer with actions taken to extend service life, we are assisting in the spread of municipal solid waste treatment facilities that contribute to the formation of a recycling-oriented society.

## ● Measures (functional preservation and quality maintenance) to extend service life that utilize our plant information database

Effective measures to extend service life (preserving function and maintaining quality) can be said to include predicting the rate of deterioration of equipment and devices, planning the range of and time for repair, etc., in advance, and aiming at extending service life before equipment performance falls below the pre-established control level.

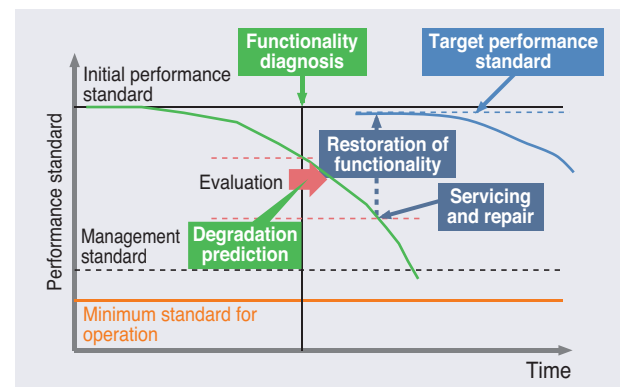
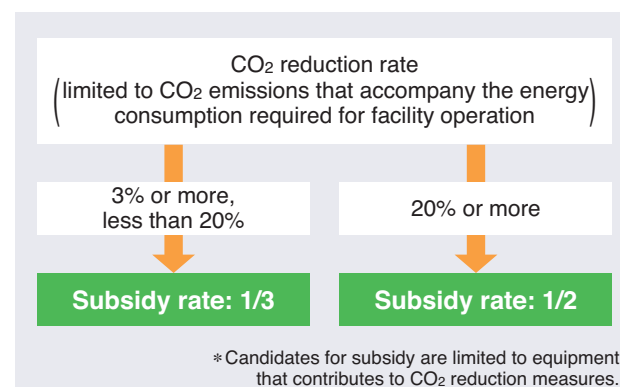


Diagram of functional diagnosis and measures to extend service life

## ● Subsidies to promote formation of a recycling-oriented society

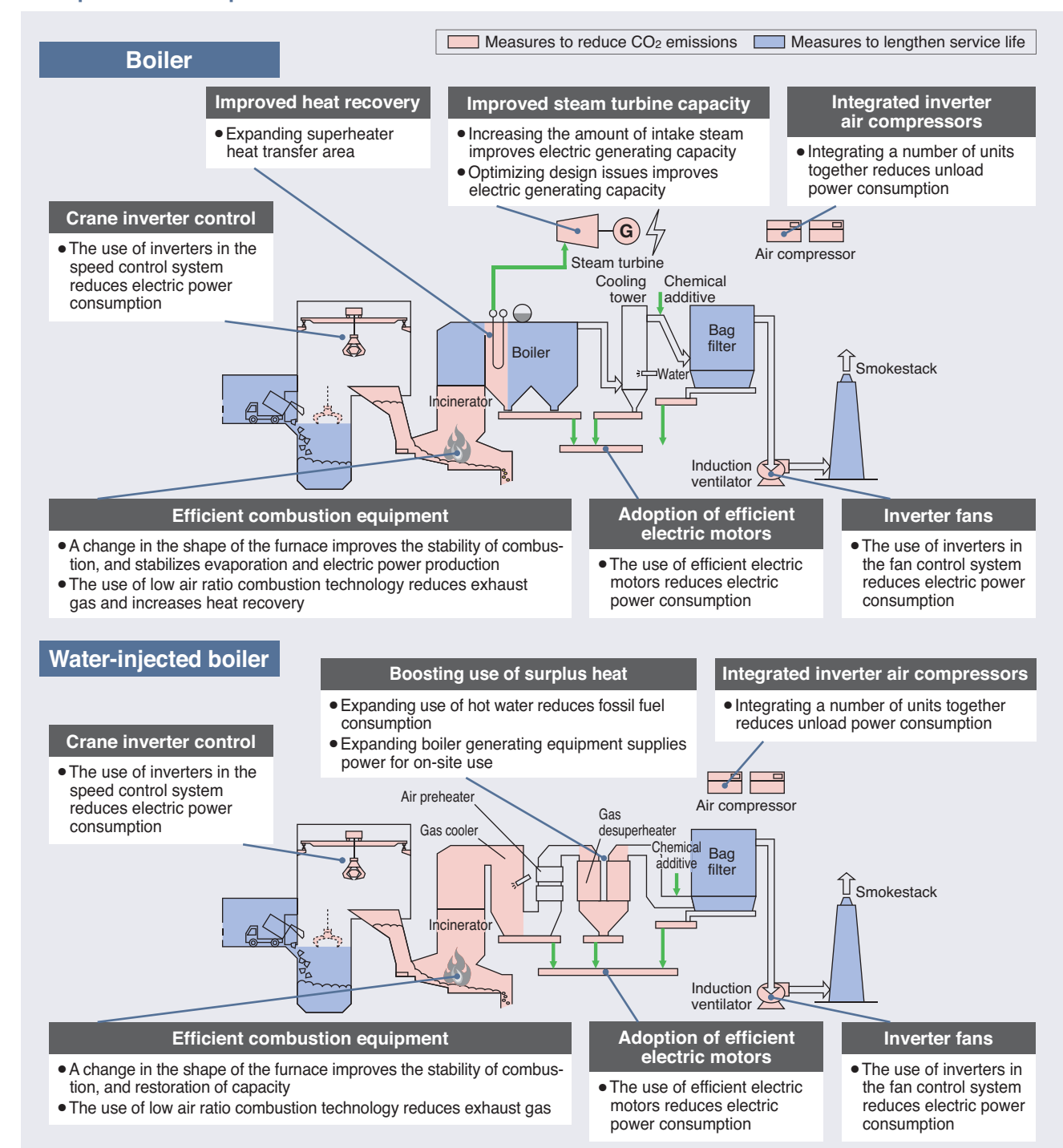
"Support upgrades to primary equipment that contributes to extending the service life of general waste treatment facilities and to the fight against global warming" is an item that was added in FY2010 to the government's "Subsidies to promote formation of a recycling-oriented society" program. That item involves appropriating subsidies according to the effect of measures to extend service life that can reduce the CO<sub>2</sub> emissions of the energy source discharged during operation of a municipal solid waste treatment facility. When CO<sub>2</sub> reduction rates are above 3% but less than 20%, a subsidy rate of 1/3 is adopted and, when the reduction rate is 20% or more, that subsidy rate climbs to 1/2.



## ● Measures to extend service life that contribute to forming a recycling-oriented society

Takuma carries out detailed investigations into the operation status of all facilities targeted in our proposals on extending service life. We then adopt the energy conservation and heat use technology that is most suitable for that facility and offer customers ways to mitigate the financial burden through subsidies to promote formation of a recycling-oriented society and towards the positive formation of a recycling-oriented society (reduction of CO<sub>2</sub> emissions and prevention of global warming).

### Examples of core improvements





# Activities of Our Maintenance Business

— Aiming at a maintenance organization that satisfies customers

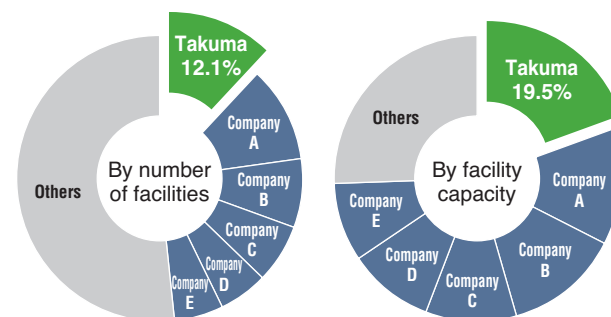
In recent years, the aging of infrastructure such as roads and buildings has become a major social issue.

The importance of appropriately maintaining and managing infrastructure has been reaffirmed, as is evident in the national government's creation of a council of experts to develop measures to achieve the strategic maintenance and management of infrastructure while extending assets' service lives\*1. The same applies to garbage treatment facilities owned by local governments: the Ministry of the Environment, which is the government agency with jurisdiction, is pushing localities to use these facilities longer by offering subsidies for construction projects designed to extend their service lives\*2.

\*1: From "The superannuation measure meeting of social capital," Ministry of Land, Infrastructure, Transport and Tourism  
\*2: "Construction Projects Designed to Improve Core Facilities," Subsidies to Promote Formation of a Recycling-Oriented Society

Takuma boasts a history of more than 50 years as a pioneer of municipal solid waste treatment facilities and the most deliveries in Japan, with a cumulative total of more than 340 facilities built and delivered.

We draw on the maintenance and management expertise that we have gained from that track record to offer optimal proposals for extending the service lives of customers' facilities.



Our share of municipal solid waste treatment facilities

## ● Takuma's after-sales service

Since the information needed to perform facility maintenance consists of analog data that, unlike numerical data, cannot be managed digitally, an operator's number of years of real-world experience has a significant impact on the quality of the maintenance. Takuma has accumulated extensive knowledge born of experience during more than 50 years of facility construction and maintenance, and we have developed the ability to provide optimal proposals for all operating conditions by communicating the technological wisdom created by that experience.

## ● Introducing the latest technologies

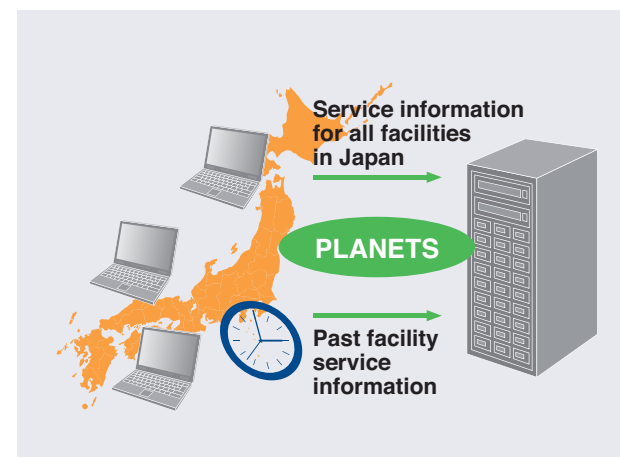
The latest technologies that are being used in new boiler construction can also be applied to existing facilities. We can provide proposals that go beyond restoring functionality to improve facility operation, for example by modifying equipment to save energy and improve operability.

## ● Maintenance planning

Takuma manages facility status using databases as well as expertise based on its long track record of experience and proposes optimal maintenance plans based on an appropriate understanding of facility status.

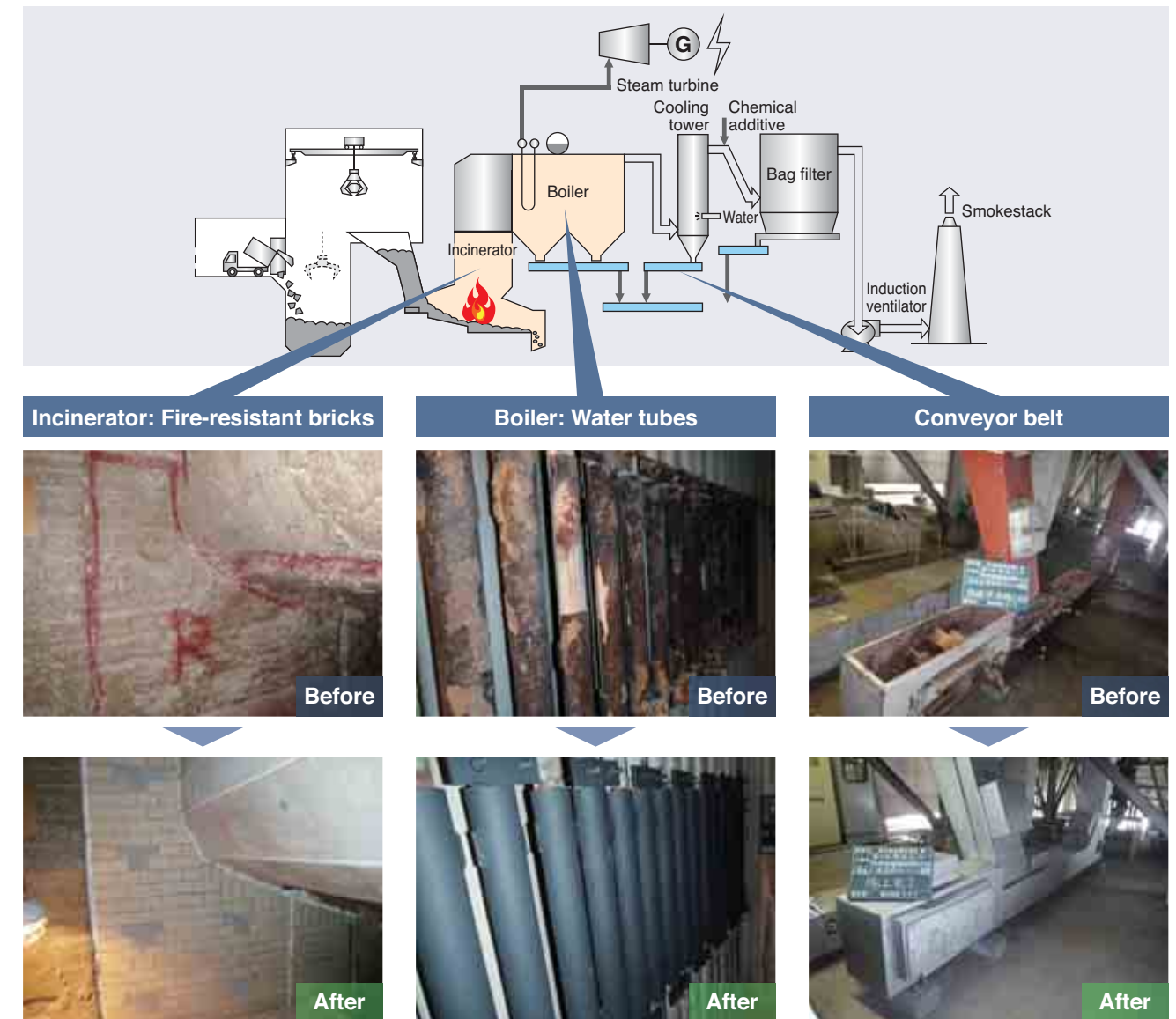
## ● Optimizing operational control

The systems used to control facilities need to be adjusted according to the materials being treated. Takuma helps ensure stable, consistent facility operation by optimizing system settings to facilitate optimal operation according to the properties of garbage, which change over the years, and variations in the materials being treated.



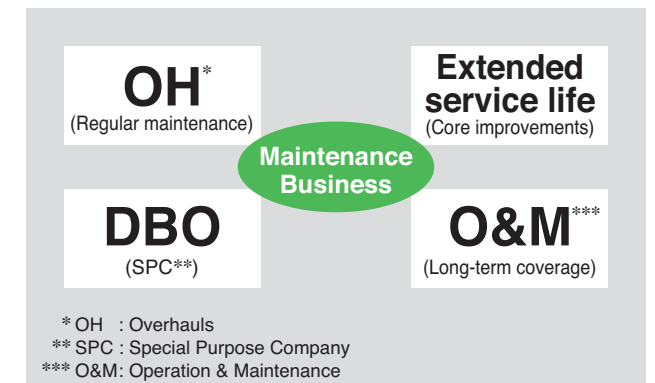
Our plant maintenance information database

## ● Example maintenance project



## ● Handling increasingly diverse maintenance projects

In recent years, the maintenance industry has been characterized by projects that have grown increasingly diverse in response to customer needs. In these as in all projects, Takuma continually strives to offer prompt service, take customer feedback seriously, and improve its offerings so as to provide customers with a higher level of satisfaction.



Diversification of our maintenance business

# Activities of Our Energy Business

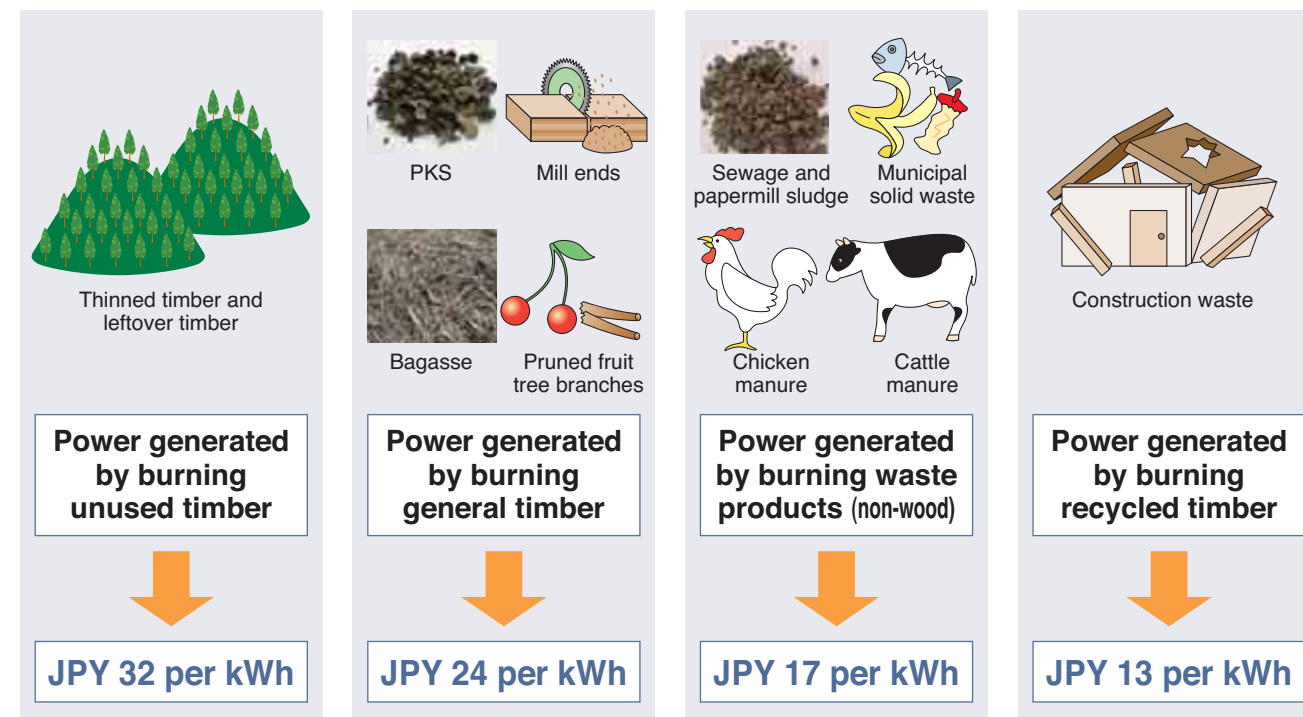
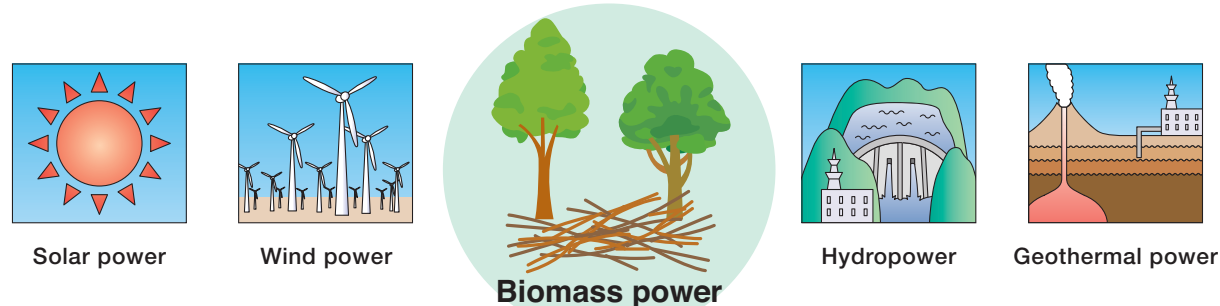
## ① Feed-in tariff program for renewable energy

### ● Feed-in tariff program for renewable energy and biomass power generation

On July 1, 2012, Japan launched a feed-in tariff program for renewable energy. Under this program, power companies purchase electricity generated using renewable energy over the long term at elevated prices. Solar power, wind power, small and medium-size hydropower, geothermal power, and biomass power are all eligible for the arrangement.

Biomass materials of various types and sources include tree-source biomass, crop biomass, livestock excrement, and waste product biomass, each with its own set of power generation costs. Consequently, a series of tiered purchase prices (ranging from JPY 13 to JPY 32 per kWh, exclusive of tax) has been put in place depending on the type of biomass being used as fuel.

#### Renewable energy sources covered by the feed-in tariff program



\* Biomass power purchases under the feed-in tariff program have been put in place for 20 years.

\* In addition to the combustion-based power generation methods listed above, biomass power generated by methane fermentation and gasification is also covered by the feed-in tariff program. A purchase price of JPY 39 per kWh has been set for power generated by methane fermentation and gasification.

### ● Biomass fuel under the feed-in tariff program

#### ● Unused timber (JPY 32 per kWh fuel)

In the forestry industry, unused timber including tree roots, tips, branches, and leaves has traditionally been abandoned in the forest as leftover timber. Similarly, trees that have been felled during thinning but whose value does not merit harvesting have remained in the forest as abandoned thinned timber. By treating timber that has been felled systematically for use as fuel in biomass power generation as unused timber along with leftover timber and thinned timber and setting a purchase price that is higher than that of other biomass materials, the feed-in tariff program is intentionally promoting use of trees from mountains, which have gone unused to date.

#### ● Waste products (non-wood) (JPY 17 per kWh fuel)

This category includes biomass that is not derived from wood, specifically waste biomass such as municipal solid waste and sewage sludge, biomass from the livestock industry such as livestock excrement, and industrial biomass such as sewage sludge, paper sludge, and black liquor.

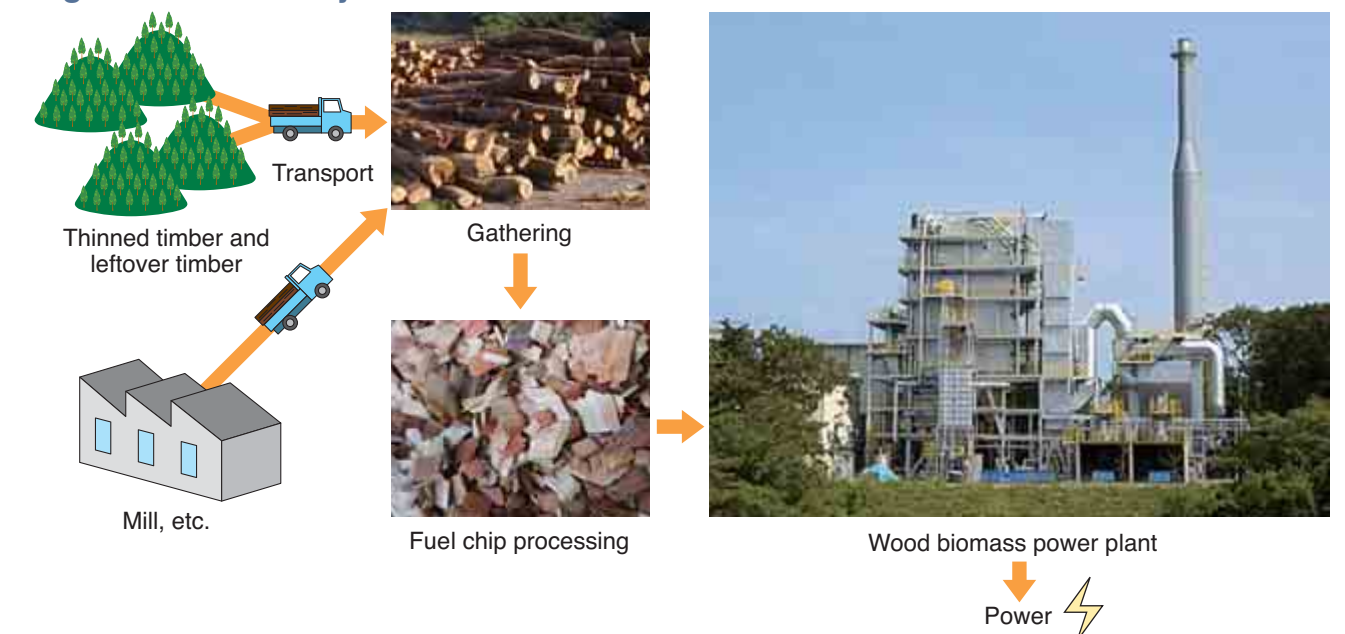
#### ● General timber (JPY 24 per kWh fuel)

Timber other than unused timber and recycled timber is collectively known as general timber. This category includes mill ends, sawdust, bark, pruned branches from farms and other sources, and driftwood from dams. While they are distinct from timber, crop residues such as bagasse and rice hulls as well as palm kernel shells (PKS), which are attracting attention as an imported fuel, have also been classified as JPY 24 per kWh fuels.

#### ● Recycled timber (JPY 13 per kWh fuel)

This category includes construction waste, which has been used as a primary fuel in wood biomass boilers and power generation for some time and which at present constitutes the most commonly used wood fuel. Under the feed-in tariff program, this type of fuel has been assigned a lower purchase price than other biomass fuels due to the comparative ease with which it can be obtained.

### ● Example biomass power scheme: Utilizing unused timber and general timber to generate electricity



A stable wood biomass power business requires comprehensive development of a fuel supply system, timber transport and storage systems, and chip processing facilities. Incidental benefits of putting such infrastructure in place include creation of regional jobs, revitalization of related industries, and appropriate management of forest resources. Such derivative benefits set biomass power apart from other generation methods and explain why biomass power is attracting attention as a regional industry.

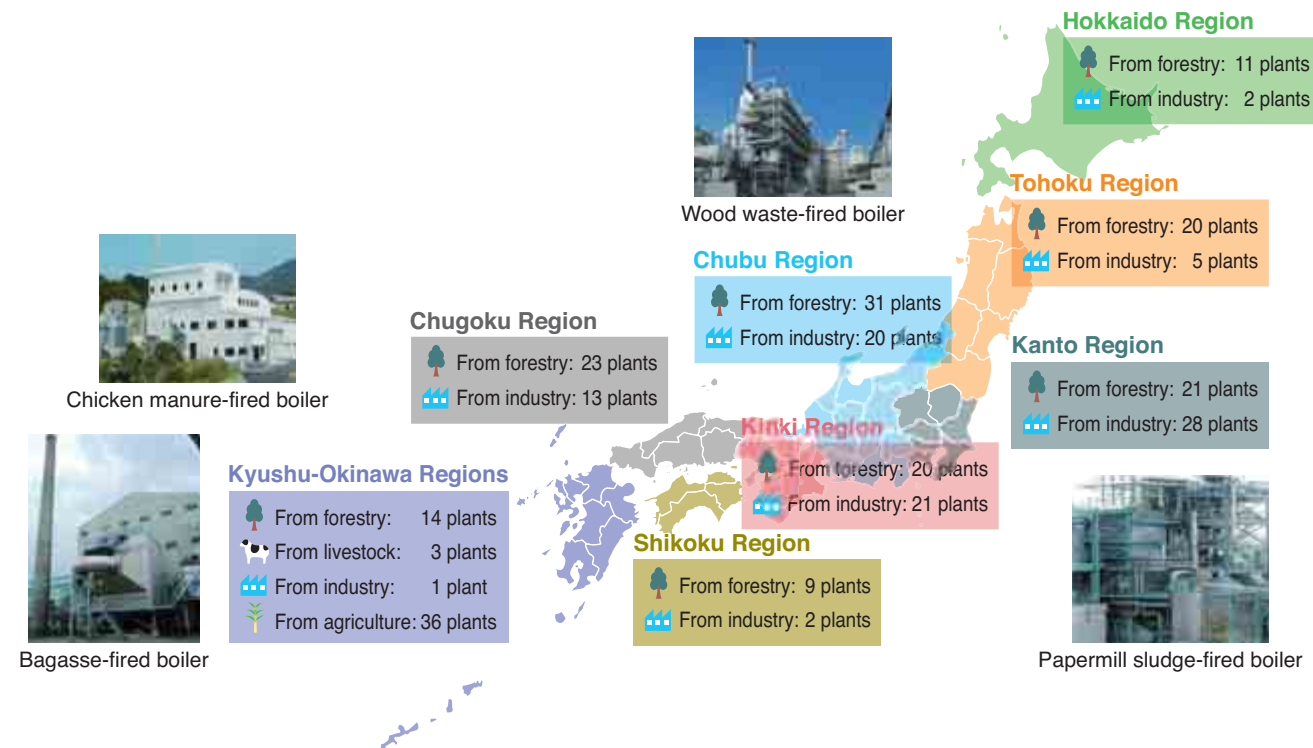


# Activities of Our Energy Business

## ② Proposing a combustion furnace based on extensive experience

### ● Extensive experience with facilities that use biomass

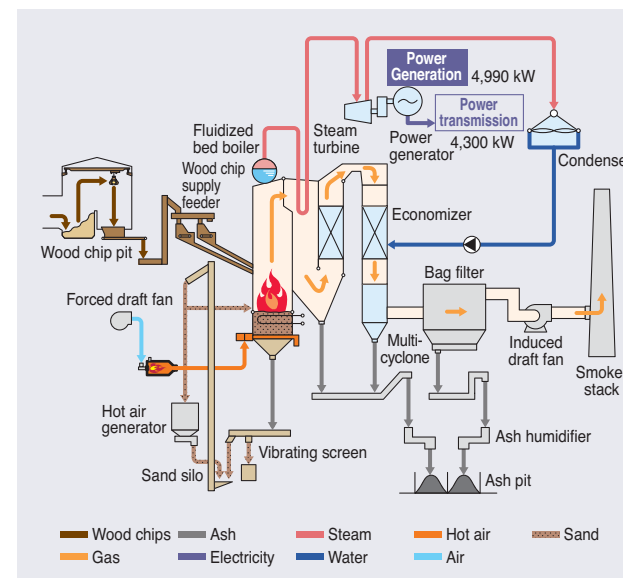
Takuma began using biomass fuel in the form of wood chips and bagasse in the second half of the 1950s, and today our products can accommodate high-water-content biomass such as paper sludge and livestock excrement. We have delivered biomass boilers and power generation equipment as well as incineration equipment to customers throughout Japan.



In 2005, we worked on Biopower Katsuta, a commercially operated wood biomass power plant located in Hitachinaka, Ibaraki Prefecture. Participation in such projects reflects our status as a leading manufacturer of wood biomass power plants since before the feed-in tariff program went into effect. The plant uses 150 tons of wood fuel per day to generate 4,990 kW, of which it sells 4,300 kW (excluding in-house power usage).



Biopower Katsuta exterior



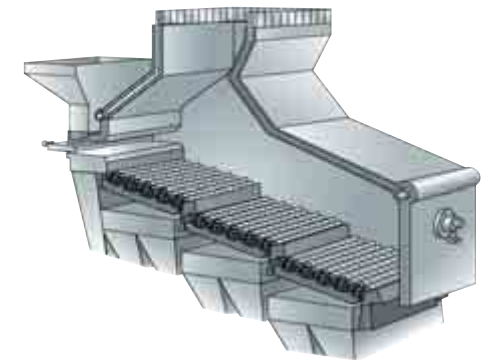
Flowchart

### ● Proposing combustion furnaces that can accommodate the fuels customers use

For biomass power plants, combustion furnaces play an important role as core power generation equipment, and the choice of combustion furnace type exerts a significant influence on biomass power businesses. Takuma offers a variety of combustion furnace types, including fixed bed, stoker, fluid bed, and rotary kiln. Below are some of the types most frequently used in biomass power generation applications.

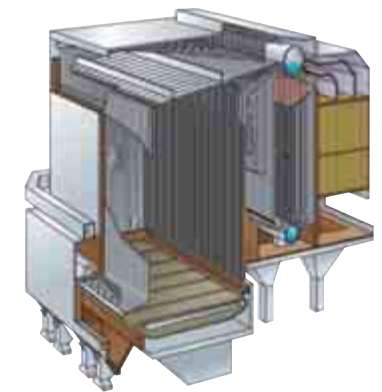
#### ● Water-cooled progressive stoker

This combustion method was created using technology from our Energy from Waste plant, a flagship Takuma product. Since fuel injected into the furnace is burned while being gradually mixed and moved with a movable stoker through drying, combustion, and post-combustion stages, progressive stokers can be used to uniformly burn fuels with different heat values, water content, shapes, and sizes. Another characteristic of stoker-type systems is that they require less power to operate (known as facility power) than other types of plant.



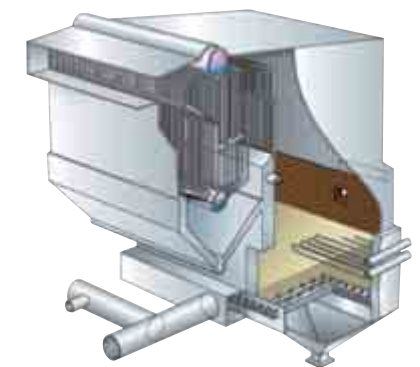
#### ● Traveling stoker

We have delivered many traveling stoker systems for use with wood biomass and bagasse. Fuel is burned on a caterpillar-type fire grate known as a traveling stoker. By using a machine known as a pneumatic spreader to inject fuel, it is possible to distribute the fuel in the furnace so that longer combustion times are secured for fuel with larger volumes. As with a progressive stoker, combustion is comparatively gradual, and the system can accommodate a wide range of fuels with different heat values, water content, and shapes.



#### ● Bubbling fluid bed

Bubbling fluid bed systems have been the most popular type of combustion furnace for wood biomass in recent years. Fluid sand inside the furnace facilitates the combustion process by burning away the surface of the chips. Consequently, little unburned fuel remains, making high boiler efficiency a characteristic of these types of systems. They are also well suited to use with high-water-content fuel.



For biomass power generation under the feed-in tariff program, the most important priority is to ensure stable plant operation over the 20-year purchase period. Consequently, it is necessary during the business plan creation stage to consider future trends for the fuel that will be procured and choose an appropriate type of combustion furnace. Takuma proposes the optimal combustion furnace type based on customer wishes as well as fuel characteristics such as heat value, water content, ash content, composition, shape, size, and mixture ratio as well as associated fluctuations.



# Our Involvement in Southeast Asia

— Towards establishing low-carbon societies in Southeast Asia

The sun's bounty nourishes biomass, and use of its renewable energy helps reduce CO<sub>2</sub>. Takuma is drawing on its accumulated experience and exceptional technology to meet the needs of our times. Our biomass power generation products reflect our commitment to conservation of the global environment and coexistence with energy supply.



Biomass power plant (bagasse)



Transporting sugarcane



Bagasse yard

## ● Biomass power plants (bagasse)

Takuma has been enhancing dispersed industrial energy infrastructure and contributing to economic growth for more than 50 years by designing, building, and operating biomass power plants that make efficient use of environmentally friendly, renewable waste resources such as agricultural and forestry processing residue instead of fossil fuels in Japan as well as overseas, particularly in Southeast Asia.

For the last several years, we have worked closely with Bangkok-based Siam Takuma to draw on our extensive experience delivering biomass power plants to supply power-generating boiler plants that burn bagasse (sugarcane pomace) for the sugar processing industry in Thailand, which enjoys a market share of close to 50%.

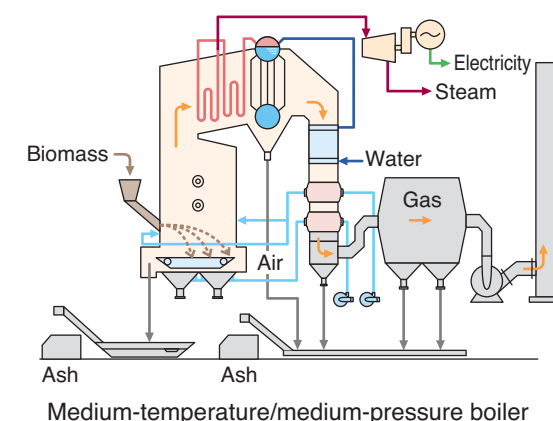


As a Japanese manufacturer with its own technology, we have been striving to bring to market competitive products at prices that compete with Indian, Chinese, and local manufacturers while maintaining carefully reasoned boiler designs capable of accommodating unique fuel composition along with the high reliability that characterizes plants based on stable quality and exceptional operational performance.



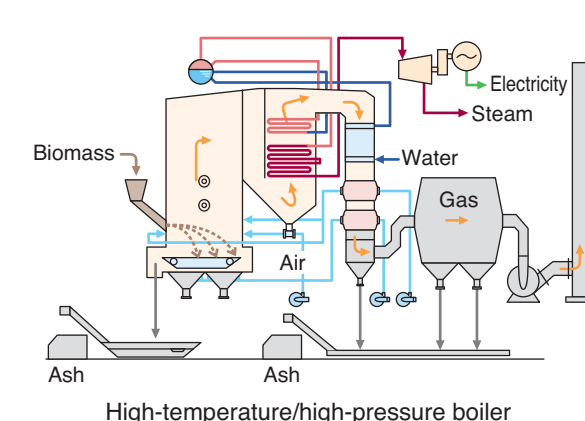
## ● Business environment in recent years

Manufacturers in Thailand's sugar processing industry have installed medium-temperature, medium-pressure bagasse-burning boilers with comparatively high capacity with the primary objective of supplying the steam and electrical energy used in their manufacturing processes. However, an increasing number of operators are seeking to capitalize on the sustained economic growth of recent years by augmenting their sugar processing business through the sale of renewable energy generated using bagasse, driving up demand for compact, high-efficiency power-generating boilers that operate at high temperature and pressure.



We are currently in the equipment manufacturing and site construction phase of a high-temperature, high-pressure power-generating boiler plant fueled by bagasse as part of a project for which we received an order in 2012.

Our track record of close cooperation with customers is well regarded in the sugar processing industry, and the completion and operation of the plants we have built for companies in the sector have attracted significant attention. We will continue to draw on our experience with high-temperature, high-pressure boiler plants to pursue activities related to the supply of new biomass generating plants.



## ● Future developments

Going forward, Takuma will work to supply power-generating boiler plants using other biomass resources (wood chips, palm kernel shells, rice hulls, corn cobs, etc.) not only to Thailand's sugar processing industry, but also throughout Southeast Asia in order to contribute to conservation of the global environment, coexistence with the supply of energy, economic and industrial development, and the creation of a rich and bountiful future.



# Activities of Our Water Treatment Business

— Aiming at preserving our precious water environments

Water is a limited resource. The water cycle, in which water on Earth evaporates due to solar heat, is cooled in the atmosphere to form rain and snow, and falls back to the Earth's surface, has been going on for billions of years. Water contaminated by human activity is part of this cycle, making purification technology necessary from the standpoint of conserving the water environment. At the same time, technology for conserving and creating energy has become necessary in recent years due to energy supply constraints. Takuma has been pursuing a water treatment business powered by a variety of characteristic technologies so that we can meet these needs while helping transition to a recycling-based society and develop a low-carbon society.

## ● Key characteristic technologies

Below are some of Takuma's representative technologies.

### • Upflow moving-bed sand filters (equipment)

We have extensive experience delivering upflow moving-bed sand filters, which are used to remove contaminants (suspended solids) from water.

Recently, higher-speed filtration has made possible systems that require less space and energy. It is also possible to add functionality for removing nitrogen and phosphorus, which cause eutrophication. We actively propose sand filter systems such as this and have extensive experience delivering them.

### • Membrane separation technology

Membrane separation is used to isolate minute particles with diameters on the order of several microns. We use membrane separation technology in water treatment at facilities such as Energy from Waste plant.

### • Advanced oxidation process

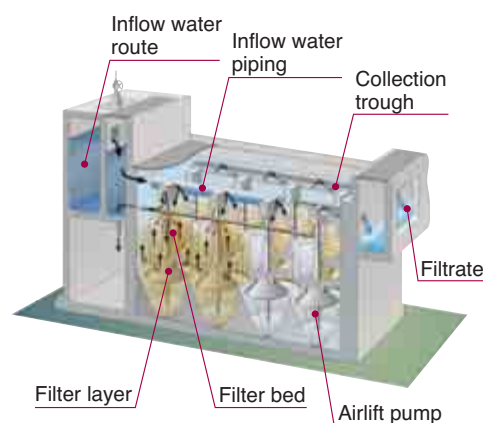
The advanced oxidation process uses a powerful oxidizing substance to break down and remove colors and chemical oxygen demand (COD) in contaminated water. In June 2013, a Takuma-built leachate treatment facility capable of processing 220 cubic meters of water per day began operation at a final disposal site.

### • Rotating drum concentrator

This low-power, compact mechanical concentrator efficiently concentrates sewage sludge while offering outstanding maintainability. Its development was based on joint research conducted with the Japan Institute of Wastewater Engineering and Technology, which certified the new technology's effectiveness in March 2013.

### • Next-generation progressive furnace

Takuma's next-generation progressive furnace is characterized by extremely low emissions of the greenhouse gas  $N_2O$  when incinerating sewage sludge. Its development was based on joint research conducted with the Japan Institute of Wastewater Engineering and Technology, the results of which were published in March 2012 as "Technology Documents Concerning the Reduction of  $N_2O$  from Sludge Incinerators."



Outline of upflow moving-bed sand filters



Example of an advanced oxidation process system



Installed rotating-drum thickener

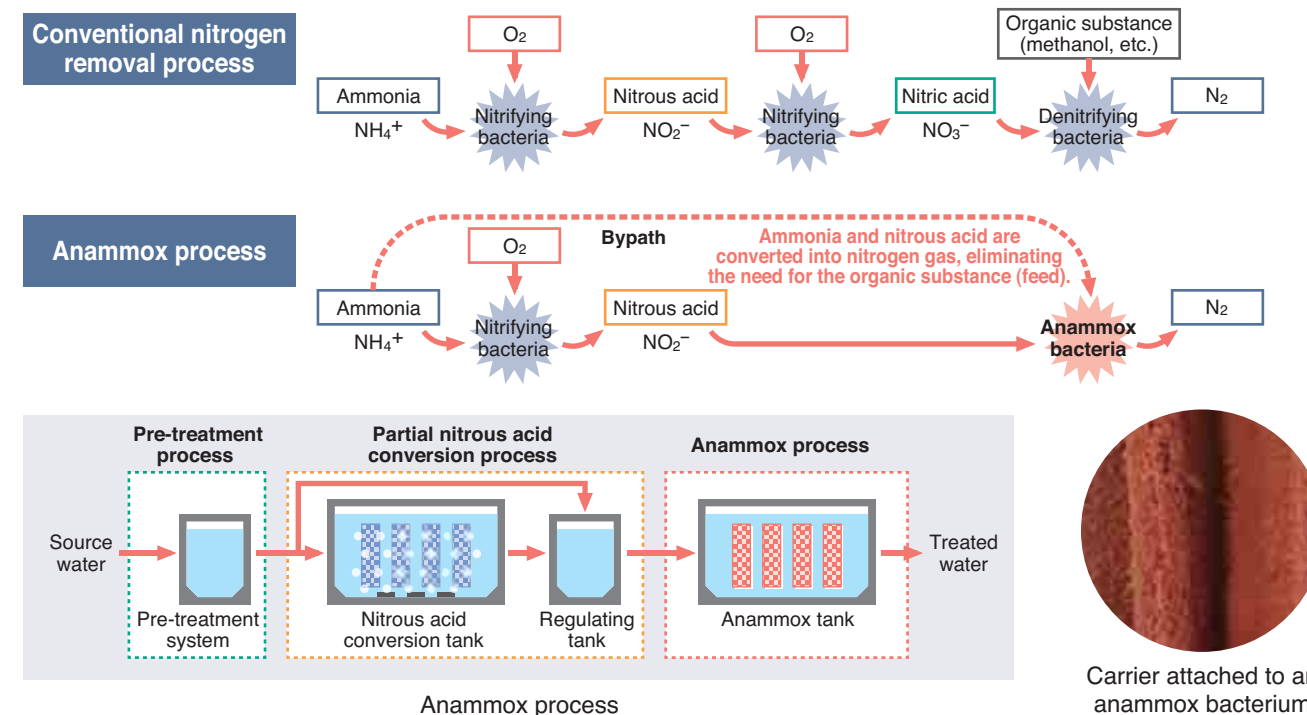


Example of a next-generation progressive furnace delivered by Takuma

## ● New technology initiatives

### ● Anammox process

The anammox process is a new technology for removing nitrogen by taking advantage of the action of anammox bacteria. Compared to conventional nitrogen removal methods, it offers an energy-saving, low-cost solution. The technology was adopted by the Ministry of Land, Infrastructure, Transport and Tourism's B-DASH Innovative Sewage Technology Demonstration Program, and it is currently in use at Japan's largest demonstration plant (see page 36 for details).

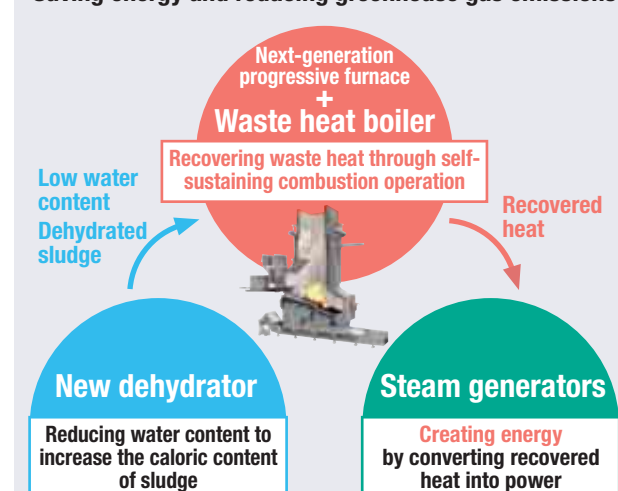


### ● Sludge-burning furnace

Since sewage sludge is a type of biomass, it is expected to serve as a source of renewable energy in the future.

Takuma is working to develop a new system for using heat produced in the incineration of sewer sludge to generate power while providing facility power for the host site. We are currently working to commercialize this system by combining technologies for reducing the water content of sludge with a new type of dehydrator and other equipment, recovering energy with a next-generation progressive furnace (with a boiler), and converting energy with steam generators (both centrifugal- and binary-type).

### Saving energy and reducing greenhouse gas emissions



Combustion waste heat power generation system



# Contributing to the Recovery and Revival from the Great East Japan Earthquake



## 1 Installation and operation of temporary incinerators (Soma City and Shinchi Town)

Takuma was involved with facilities for processing (by incinerating) disaster waste from the city of Soma and the town of Shinchi, which were heavily damaged by the Great East Japan Earthquake, starting with the plant design and construction stage and extending to operation of the facilities until 2012 under the Act on Special Measures for Treating Disaster Waste from the Great East Japan Earthquake. As of March 2013, a total of 24,000 tons of sorted flammable waste had been incinerated.

### Project outline

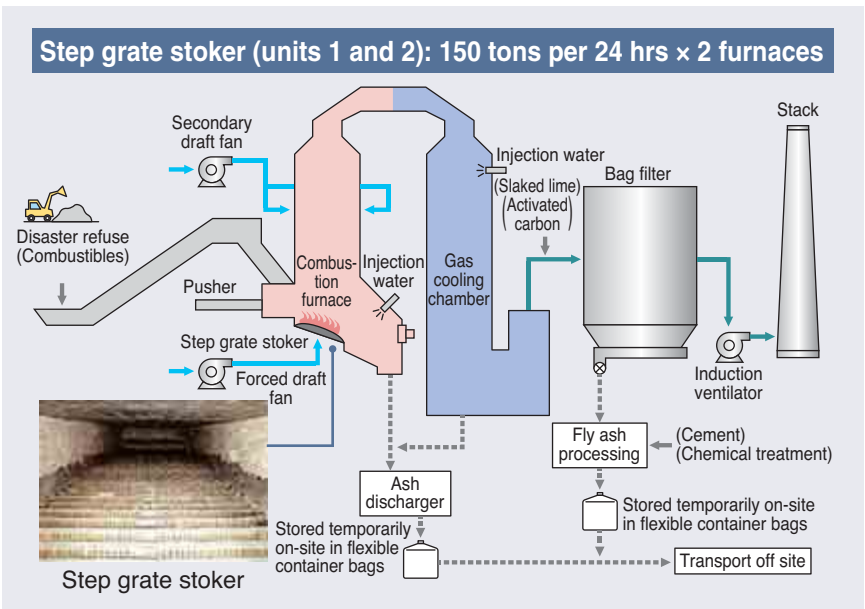
|                    |   |
|--------------------|---|
| Name               | Construction of Temporary Incineration Plants to Process Disaster Waste from the Great East Japan Earthquake on Behalf of the Japanese Government (in the City of Soma and the Town of Shinchi), FY2012 |
| Client             | Ministry of the Environment   |
| Location           | Soma City, Fukushima Prefecture   |
| Material processed | Disaster waste (waste lumber, flammable bulk waste, waste plastic, tatami, blankets, etc.)  |
| Facility capacity  | Step grate stoker: 300 tons per 24 hrs<br>(150 tons per 24 hrs × 2 furnaces)<br>Rotary grate stoker: 270 tons per 24 hrs × 1 furnace  |



Temporary incinerators (Soma City and Shinchi Town)



Waste being burned inside an incinerator



## 2 Status of disaster waste processing efforts (Miyako district/Iwanuma district)



Temporary incinerators (Miyako district)



Temporary incinerators (Iwanuma processing district)

Takuma operates and manages these temporary incinerators, which have been installed in Iwate Prefecture (Miyako district) and Miyagi Prefecture (Iwanuma processing district) to properly process flammable disaster waste from the Great East Japan Earthquake.

In the Miyako district, processing of disaster waste began in March 2012, and 29,500 tons of waste had been incinerated by March 2013. Processing is expected to be complete by March 2014.

In the Iwanuma district, processing of disaster waste began in May 2012, and 37,300 tons of waste had been incinerated by March 2013. Processing is expected to be complete by January 2014.



Waste being burned inside an incinerator

### Project outline

| Item  | Miyako district  | Iwanuma processing district   |
|---|--|---|
| Name  | Operation and Management of a Temporary Incinerator in the Miyako District                               | Operation of a Temporary Incinerator as Part of Disaster Waste Processing Operations in Miyagi Prefecture (Watari-Natori Block [Iwanuma Processing District]) |
| Client  | Iwate Prefecture   | Consortium consisting of Hazama Ando, Okuda, Uenogumi, Haruyama Construction, and Sato Construction (led by Miyagi Prefecture)                                |
| Location  | Miyako City, Iwate Prefecture  | Iwanuma City, Miyagi Prefecture   |
| Material processed                                | Disaster waste (waste lumber, flammable bulk waste, waste plastic, tatami, blankets, etc.)               | Disaster waste (wood chips, waste plastic, flammable bulk waste)  |
| Facility capacity                                 | Fixed bed stoker: 95 tons per 24 hrs<br>(47.5 tons per 24 hrs × 2 furnaces)                              | Fixed bed stoker: 100 tons per 24 hrs<br>(50 tons per 24 hrs × 2 furnaces)<br>Kiln furnace: 95 tons per 24 hrs<br>(95 tons per 24 hrs × 1 furnace)            |
| Operations  | Acceptance of disaster waste<br>Operational control, maintenance, and oversight of temporary incinerator | Operation and oversight of temporary incinerator<br>Maintenance and management of temporary incinerator   |
| Cumulative processing performance (By March 2013) | 29,500t  | 37,300t   |

Going forward, we will continue to work as a group to properly process disaster waste based on our experience and expertise in this area in order that affected areas to be able to recover from the disaster as quickly as possible.



### ③ Developing a system for removing radioactive cesium from incinerator fly ash

Takuma developed a system for effectively removing radioactive cesium from incinerator fly ash (t-RECs).

#### ● Development process

When waste contaminated with radioactive cesium is incinerated, most of the cesium is volatilized or turned into droplets, causing it to enter the gas stream. Then it condenses into solid particles during the subsequent cooling process and collects in the bag filter along with fly ash, so that it is removed from exhaust gas. In this way, radioactive cesium in waste is concentrated into fly ash (see Figure 1).

Under the Act on Special Measures for Processing Radioactive Substances ("the Act"), the method for disposing of fly ash containing radioactive cesium through burial depends on the level of radioactivity. However, the location in which the substance will be buried has not yet been determined, leaving incinerator operators no choice but to temporarily store it at incinerator sites, and the lack of adequate storage locations has become a major social issue. Against this backdrop, a need developed for technology that could remove radioactive cesium from incinerated fly ash while simultaneously reducing the volume of the radioactive substances removed in this manner.

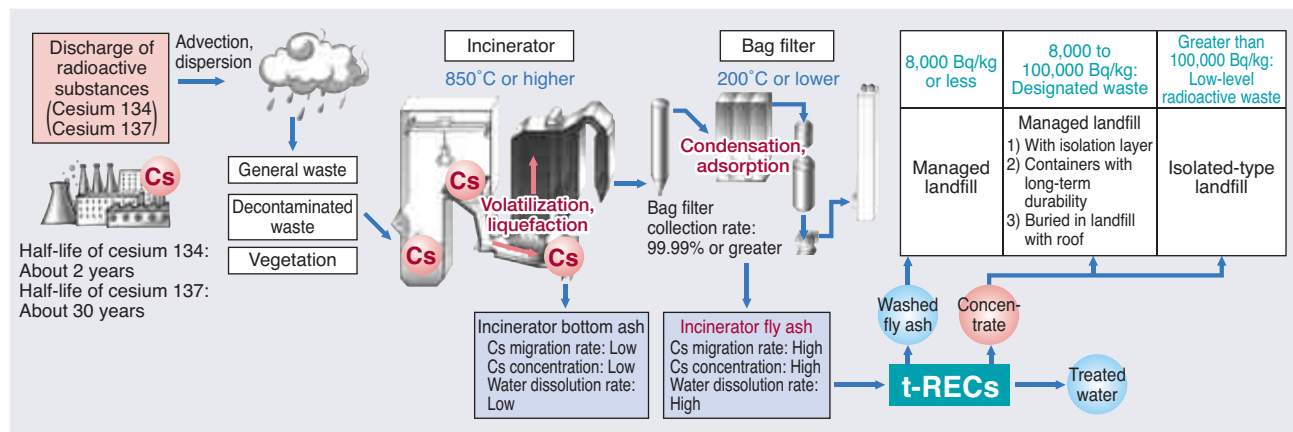


Figure 1. Behavior of Radioactive Cesium at a Waste Incineration Facility

#### ● t-RECs overview and characteristics

The t-RECs system was developed by taking advantage of the fact that radioactive cesium in incinerator fly ash is easily removed by washing with water. It consists of three processes: (1) cesium extraction, (2) cesium adsorption and elution, and (3) cesium concentration and accumulation. (See Figure 2.)

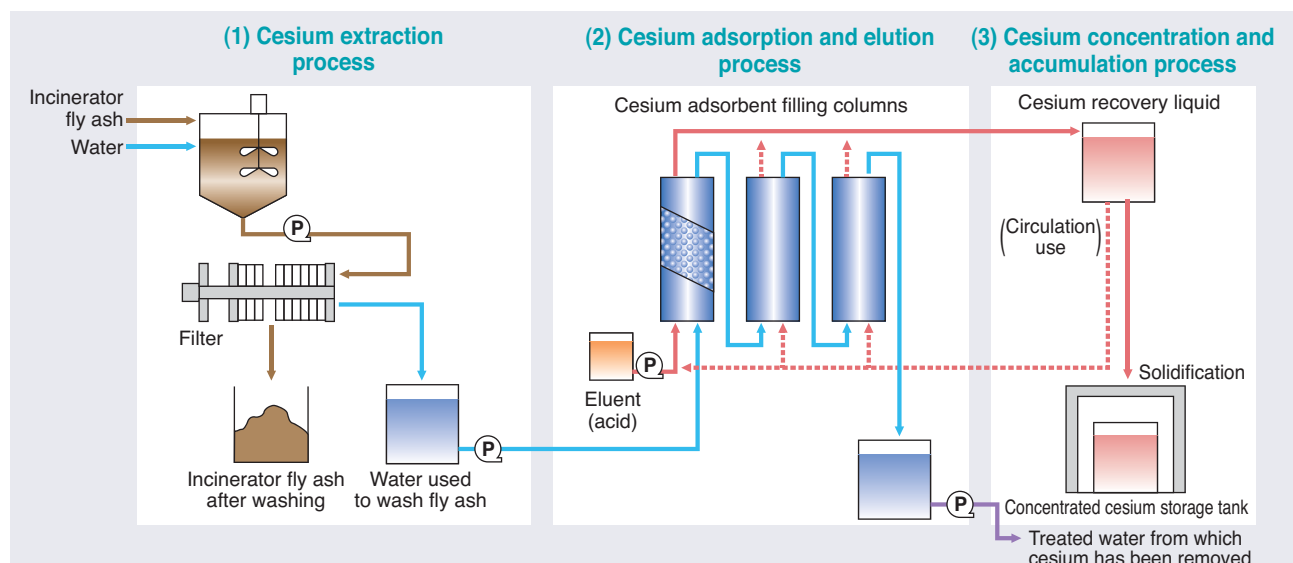


Figure 2. System Treatment Process

The processes have the following characteristics:

#### (1) Cesium extraction process

By mixing water with the incinerator fly ash, about 90% of the radioactive cesium in the ash migrates into the water. Next, the fly ash and wash water are separated into solid and liquid components by a filter. Since the concentration of radioactive cesium in the fly ash has been reduced to the level of 8,000 Bq/kg or less as defined by the Act, the fly ash can be transported to a normal managed landfill.

#### (2) Cesium adsorption and elution process

The fly ash wash water contains a large amount of radioactive cesium. Since t-RECs uses a special adsorbent that selectively adsorbs cesium so that it can separate radioactive cesium from the wash water at a high efficiency of 99% or greater, the wash water can be sent to the incineration facility's on-site wastewater treatment plant or a similar facility.

Since the adsorbent used by t-RECs offers outstanding selectivity for cesium, it is not susceptible to being influenced by the sodium or potassium that coexist in the wash water. Zeolite is well known as a typical adsorbent, but since it also adsorbs these coexisting substances along with cesium, it must be replaced after a comparatively short period of time. The adsorbent used by t-RECs differs from

zeolite in that the adsorbed cesium can be easily recovered using an acid solution (the eluent), and its most striking characteristic is the fact that it can be reused repeatedly. (See Figure 3.)

#### (3) Cesium concentration and accumulation process

The acid solution used to recover radioactive cesium during the preceding process can also be used during the next column elution step. Consequently, the concentration of radioactive cesium in the eluent can be adjusted by varying the number of times the eluent is reused. (See Figure 2.)

Finally, the eluent into which the radioactive cesium has been concentrated is treated by means of a neutralization process, and then a fixation agent is added to prevent leaks. Even at this stage, the volume has been reduced to 1/10 of the fly ash volume before washing, but it is possible to further reduce the volume to 1/10 of that level by removing moisture from the solid, for example by using low-temperature waste heat from the incineration facility (thereby lowering the volume to 1/100 of the fly ash before washing). The solid is sealed in containers with radioactive shielding for storage and transported to an intermediate storage facility or final disposal site.

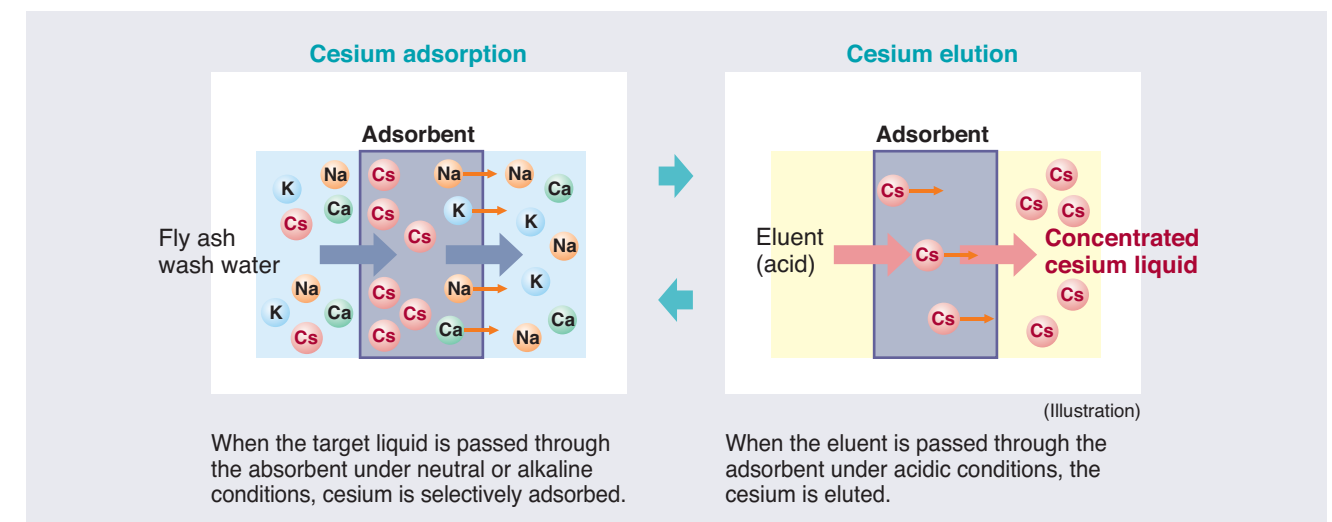


Figure 3. Cesium Adsorption and Elution Mechanisms

#### ● Development benefits and future prospects

During trials of the t-RECs system through FY2012, we were able to not only collect an extensive range of data, but also verify the system's high level of performance. Currently, we are preparing to begin selling the system in earnest. We also plan to study whether the scope of the system's use can be expanded to include removal of radioactive cesium from sewage sludge and soil.

In order to speed the recovery of affected areas, Takuma will continue to work toward the proper processing of disaster waste using not only temporary incinerators, but also its t-RECs system.

Takuma has entered the power supply business by constructing a solar power plant at the site of its Harima Factory.

On March 11, 2011, an earthquake occurring off the Pacific coast of the Tohoku region caused an accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant. Distrust in the administration of nuclear power plants triggered by widespread damage from the Fukushima accident made the shutdown of other nuclear power plants in Japan inevitable, leading to chronic power shortages. In the face of mounting pressure to review future energy policy, Japan launched a feed-in tariff (FIT) program for renewable energy on July 1, 2012, to encourage more widespread use of renewable energy.

Under this program, the national government guarantees power company purchases of power generated using five types of renewable energy (solar, wind, biomass, geothermal, and small- and medium-scale hydro) at fixed prices over a fixed period of time. The cost of these purchases by power companies is to be underwritten by fees collected from electricity users.

Takuma has identified the renewable energy utilization and environmental preservation field as one of the group's principal business domains, and we have worked to promote and expand use of renewable energy, for example through our deliveries of biomass- and waste-fueled power plants and the participation of group companies in biomass- and waste-fueled power generation businesses.

We believe that the construction of a solar-powered renew-

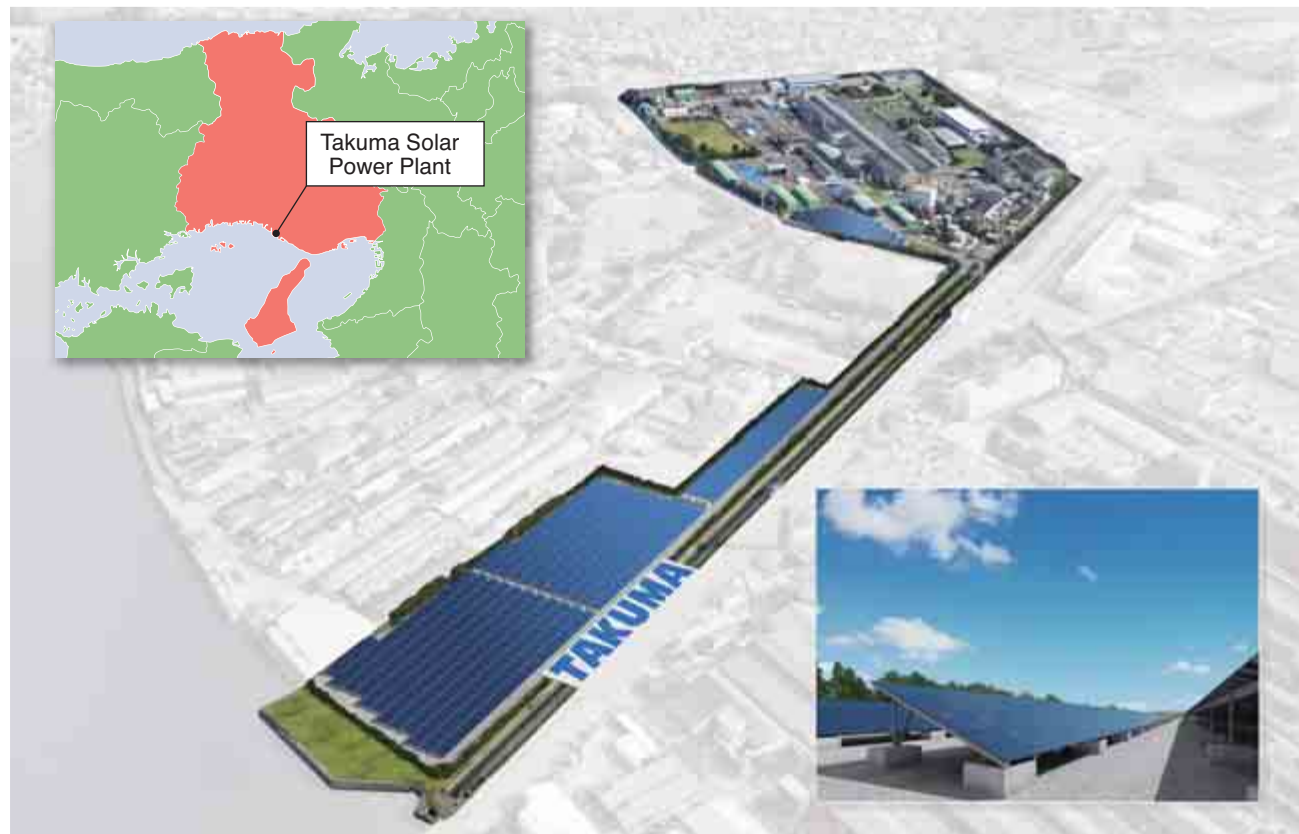
able energy power plant was a project whose time had come.

Certification of the facility by the Ministry of Economy, Trade and Industry and meetings with power companies were completed during FY2012, and we expect its construction, which will take about five months, to be complete in October 2013. After its completion, we plan to operate the facility while continuously checking whether its power output is in line with our business plan and to collect and make public data in such areas of operation as degradation over time and maintenance and management.

The new plant integrates well with our corporate vision, and we look forward to welcoming local residents and others as they tour the facility. Going forward, the Takuma Group will continue to contribute to environmental preservation and the promotion and expansion of renewable energy through its business activities.

#### Facility overview

|                               |  |
|-------------------------------|--|
| Name:                         | Takuma Solar Power Plant                               |
| Location:                     | Takasago City, Hyogo Prefecture                        |
| Panel installed area:         | Approx. 28,000 m <sup>2</sup>                          |
| Number of installed panels:   | Approx. 12,000   |
| Power output:                 | Approx. 1,950 kW                                       |
| Annual forecast power output: | Approx. 2,200 MWh<br>(Enough to power about 600 homes) |
| CO <sub>2</sub> reduction:    | Approx. 990 tons per year                              |



Working in concert with the City of Kumamoto and the Japan Sewage Works Agency, Takuma is conducting a project entitled Technology Demonstration Research into Technology for High-efficiency Nitrogen Removal using a Fixed-bed Anammox Process as part of the Ministry of Land, Infrastructure, Transport and Tourism's B-DASH Innovative Sewage Technology Demonstration Program\*1. The project involves constructing and operating a full-scale demonstration plant at a sewage treatment plant and gathering data to demonstrate the efficacy of the technology. The demonstration plant is Japan's largest anammox process\*2 to be installed at a sewage treatment plant.

\*1 B-DASH Project (Breakthrough by Dynamic Approach in Sewage High Technology Project): A technology demonstration project undertaken by the Ministry of Land, Infrastructure, Transport and Tourism to construct and demonstrate the viability of full-scale facilities incorporating innovative technologies for dramatically reducing the cost of sewage facilities while helping increase energy savings and energy creation benefits.

\*2 Anammox process (anaerobic ammonium oxidation process): A technology for removing nitrogen by taking advantage of the activity of anammox bacteria that was discovered in the Netherlands in the 1990s. The approach offers dramatically reduced running costs, energy consumption, and greenhouse gas emissions compared to conventional nitrogen removal technologies (see page 30).

#### ● Project background

In the sludge digestion (methane fermentation) approach used at sewage treatment plants, which is attracting attention due to its biomass power generation potential, the dehydrated filtrate generated by the treatment process contains high concentrations of nitrogen and phosphorus, triggering concerns about degradation of water quality if it is discharged as-is and increased treatment costs if it is treated prior to discharge. Nitrogen removal using the anammox process is attracting attention as one way to address these concerns.

#### Project overview

|                   |  |
|-------------------|--|
| Client:           | National Institute for Land and Infrastructure Management, Ministry of Land, Infrastructure, Transport and Tourism       |
| Project name:     | Technology Demonstration Research into Technology for High-efficiency Nitrogen Removal using a Fixed-bed Anammox Process |
| Location:         | Kumamoto Tobu Sewage Center  |
| Target:           | Dehydrated filtrate derived from anaerobically digested sludge   |
| Treatment volume: | 50 m <sup>3</sup> per day  |



Kumamoto Tobu Anammox Demonstration Plant

#### ● Project progress

The anammox demonstration plant was built from July to November 2012 and began demonstration operation in February 2013 following a trial operation and acclimatization process. The photograph below shows a carrier containing the anammox bacteria that will serve as the seed sludge being moved to the demonstration plant. Currently, the demonstration plant is operating smoothly, and data is being gathered.

#### ● Future prospects

The anammox process has inspired high expectations as a next-generation nitrogen removal technology. This revolutionary biological reaction was discovered about 20 years ago, and studies into its full-scale deployment are underway in Japan. The demonstration project, which involves a full-scale plant, is playing a pioneering role in the commercialization and promotion of this technology. Takuma will work to ensure the project succeeds and to leverage its results to spread the technology to sewage treatment plants and industrial wastewater plants.



Movement of the anammox bacteria carrier



## Receiving an Order for a High-temperature Water Boiler for a Heat Supply Company in Horlivka, Ukraine

Takuma Group company Nippon Thermoener Co., Ltd., (NTEC) and Asuka Green Investment Co., Ltd., (AGI) recently entered into a sales contract for a high-temperature water boiler for a heat supply company in Horlivka, Ukraine, under a Green Investment Scheme (GIS)\*1.

In the project, which is being carried out as a GIS project based on an AAU\*2 purchase agreement executed by the New Energy and Industrial Technology Development Organization (NEDO) and the State Environmental Investment Agency of Ukraine (SEIA), SEIA affiliate Derzhcoinvest and AGI have entered into a boiler supply contract that specifies the delivery of eight of NTEC's HR-400 FII high-temperature water boilers.

Like other Ukrainian cities, Horlivka uses a local heat supply system to provide hot water for heating use, and the boiler house at the heart of the system uses natural gas, a fossil fuel. Hot water heating, which constitutes critical infrastructure during the cold Ukrainian winter, supplies thermal demand consisting primarily of public facilities and residences in the city. Built during the Soviet era, these facilities are aging, and the need to update their equipment, including for reasons related to their environmental impact and energy consumption, has become a pressing issue.

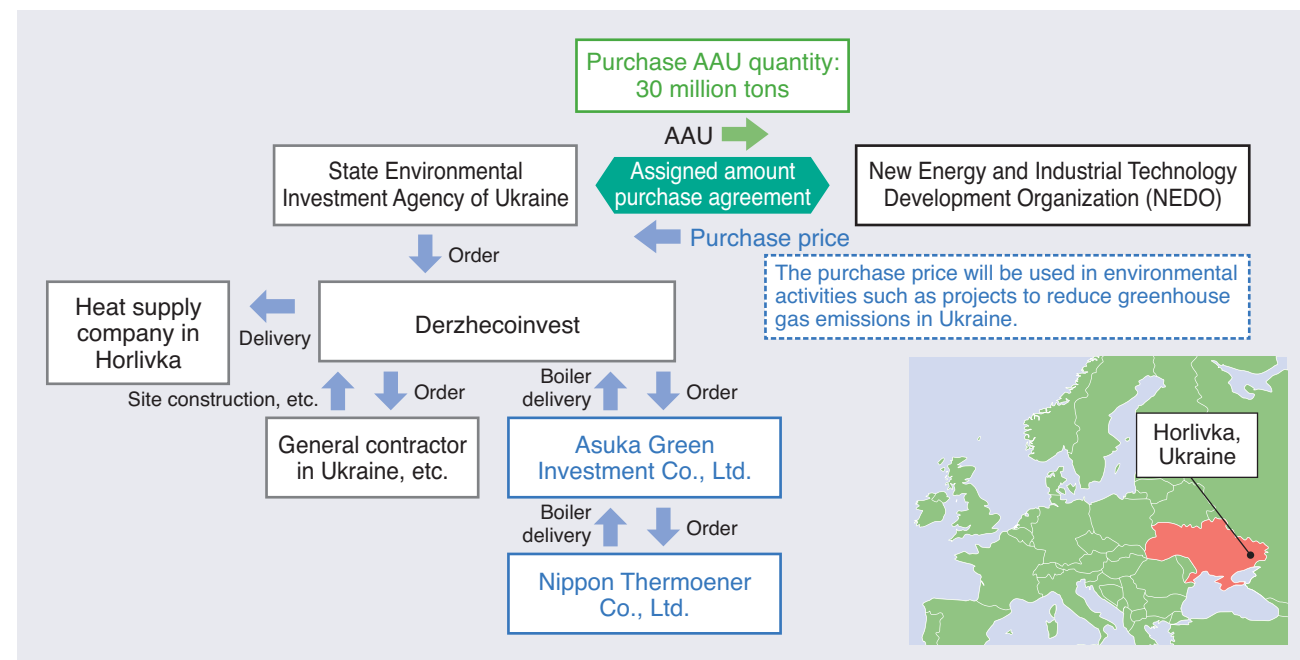
In addition to replacing the city's large, superannuated hot water boilers with NTEC's high-efficiency hot water boiler system, the project will increase the local heat supply system's efficiency and deliver stable hot water heating by

increasing the number of boilers and dispersing them so that they are located closer to demand centers. Improvements in the efficiency of state-of-the-art hot water boilers and improvements to heat supply systems thanks to dispersion have made it possible to provide a stable supply of hot water for heating use, and the project is expected to yield a reduction in fossil fuel use of about 30% after deployment as well as associated reductions in CO<sub>2</sub> emissions.

There are many superannuated heat supply facilities in Ukraine, and NTEC and AGI plan to contribute to the country's development by using the project as a model case as they promote improvements and updates to heat supply equipment in the country.

### Overview of equipment to be delivered

|                                    |  |
|------------------------------------|--|
| Boiler type:                       | Flue and smoke tube hot water boiler   |
| Maximum continuous thermal output: | 4,651 kW   |
| Maximum operating temperature:     | 183°C  |
| Boiler efficiency:                 | 92% or higher  |
|                                    | (Hot water conditions: Boiler inlet temperature of 85°C and outlet temperature of 115°C) |
| Combustion type:                   | Gas-fired with PI control  |



\*1 Green Investment Scheme (GIS): An international emissions transaction carried out in accordance with Article 17 of the Kyoto Protocol, with funds derived from the transfer of an assigned amount being used to implement environmental measures, for example to reduce greenhouse gas emissions. On March 18, 2009, NEDO and SEIA entered into a purchase agreement for 30 million tons of AAUs. Under the terms of the agreement, the AAU purchase price paid by NEDO will be used to fund activities to reduce greenhouse gas emissions and implement environmental protections.

\*2 Assigned Amount Units (AAUs): A greenhouse gas emissions allowance assigned to developed nations with reduction targets (Annex B countries) in accordance with Article 3 of the Kyoto Protocol.

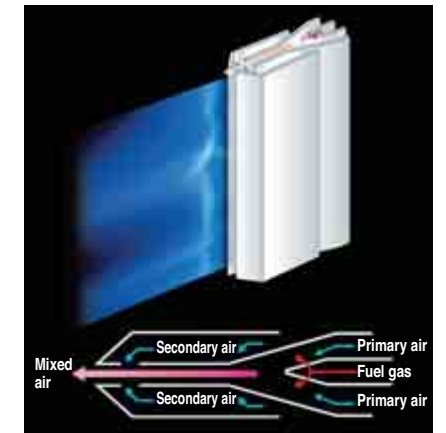
## Awards Received from Outside Organizations

— Jet-film combustion high-efficiency minimum emission boiler (winner of the President's Prize at the Excellent Environmental Equipment Commendations Awards)

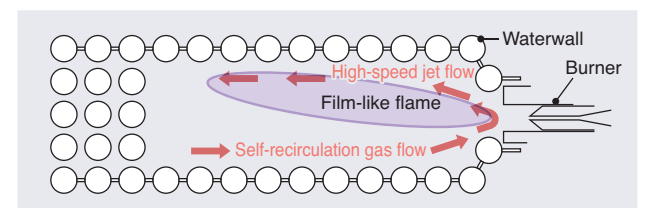
Along with Takuma Group company Nippon Thermoener Co., Ltd., Takuma's jet-film combustion high-efficiency minimum emission boiler (Super Eqos EQi series) received the President's Prize at the 38<sup>th</sup> Excellent Environmental Equipment Commendations Awards\* held by the Japan Society of Industrial Machinery Manufacturers.

The Super Eqos EQi series forms a film-like flame through a vertical high-speed injection gas burner that promotes cooling of that flame and a self-recirculation gas flow inside the boiler combustion chamber. The result is a small gas-fired once-through boiler with a low air ratio ( $\lambda = 1.17$ ) that is capable of reducing both CO and NOx simultaneously and improving boiler efficiency. Jointly developed by Takuma and Nippon Thermoener Co., Ltd., it is manufactured and sold by Nippon Thermoener. The product line includes EQi-2000/2500 compact once-through boilers (with a heat transfer area of less than 10 m<sup>2</sup>) and EQi-6000 small-scale once-through boilers (with a heat transfer area of less than 30 m<sup>2</sup>).

We have already received a patent on the burner design, and we plan to apply its features to other products in the future as part of our ongoing effort to develop products that help reduce environment impacts.



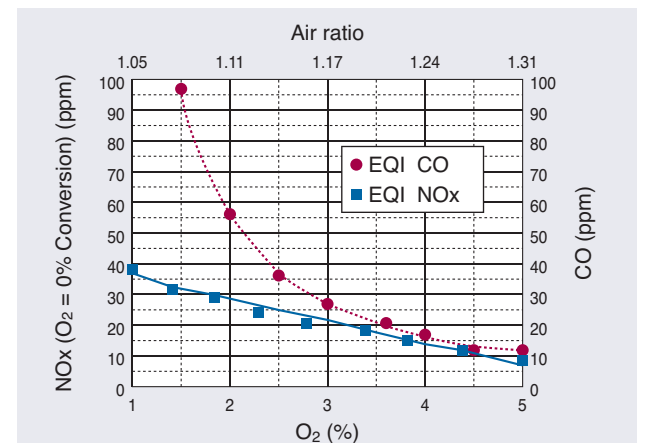
Burner structure



Cross-sectional view of the EQi-2000/2500 combustion chamber

### \*Excellent Environmental Equipment Commendations Awards

An award program administered by the Japan Society of Industrial Machinery Manufacturers. By selecting outstanding environmental systems designed to address domestic and global-scale environmental issues, which are recently becoming progressively more varied, and recognizing the businesses responsible for their development and manufacture as well as the individual developers who worked on the projects in question, the program seeks to promote research and development into environmental preservation technologies and to spur the widespread adoption of outstanding environmental systems, ultimately helping to conserve the Earth's environment.



EQi-2000/2500 combustion characteristics



EQi-2000/2500: A 3-unit installation



EQi-6000: A 3-unit installation

The following are the main facilities supplied by Takuma during FY2012.

### ● Municipal solid waste treatment plants

#### ■ Hitachinaka Tokai Clean Center (new facility)



|              |  |
|--------------|--|
| Project name | Hitachinaka Tokai Clean Center Facility Maintenance and Operation Project (provisional name)   |
| Capacity     | Incineration facility: 220 tons per day (110 tons per day x 2 units)<br>Generating capacity: 4,600 kW<br>Melting facility: 25 tons per day |
| Location     | Ibaraki Prefecture   |

#### ■ Joso Environment Center (new facility)



|              |  |
|--------------|--|
| Project name | Joso Environment Center Tertiary Garbage Processing Facility Construction Project (provisional name)   |
| Capacity     | Incineration facility: 258 tons per day (86 tons per day x 3 units)<br>Generating capacity: 3,000 kW<br>Recycling facility: 127 tons per 5 hours |
| Location     | Ibaraki Prefecture   |

#### ■ Koyo Clean Center (new facility)



|              |  |
|--------------|--|
| Project name | Somahobu Sanitation Control Association Garbage Incinerator Construction Project (provisional name: Koyo Clean Center) |
| Capacity     | Incineration facility: 43 tons per day (21.5 tons per day x 2 units)   |
| Location     | Fukushima Prefecture   |

#### ■ Tamamuramachi Clean Center (core facility improvement)



|              |  |
|--------------|--|
| Project name | Improvements to Core Equipment at the Tamamuramachi Clean Center to Extend Its Service Life (funded by grants to promote the formation of a recycling-based society) |
| Capacity     | Incineration facility: 90 tons per day (45 tons per day x 2 units)   |
| Location     | Gunma Prefecture   |

### ● Industrial waste treatment plants

#### ■ Kakuyama Kaihatu Co., Ltd.



|              |  |
|--------------|--|
| Project name | Industrial Waste Incineration Processing Facility Construction Project         |
| Capacity     | Processed material: Industrial waste<br>Processing capacity: 45.6 tons per day |
| Location     | Hokkaido Prefecture  |

### ● Energy plants

#### ■ Nangokukosan Co., Ltd.



|              |  |
|--------------|--|
| Project name | Manure Power Plant Construction Project  |
| Capacity     | Fuel: Poultry and cattle manure<br>Steam conditions: 35 tons per hour x 1.67 MPaG x saturated (206°C)<br>Generating capacity: 1,500 kW + 80 kW |
| Location     | Miyazaki Prefecture  |

#### ■ Tokushu Tokai Paper Co., Ltd.



|              |  |
|--------------|--|
| Project name | Boiler Equipment Installation Project  |
| Capacity     | Fuel: PRF, wood chips<br>Steam conditions: 23.5 tons per hour x 1.4 MPaG x saturated (198°C) |
| Location     | Shizuoka Prefecture  |

#### ■ Toyama Kankyo Seibi Co., Ltd.



|              |   |
|--------------|---|
| Project name | Waste Heat Boiler Update Work   |
| Capacity     | Fuel: Industrial incinerator waste gas<br>Steam conditions: 13 tons per hour x 3.0 MPaG x 300°C |
| Location     | Toyama Prefecture   |

### ● Water treatment plants

#### ■ Tataru River Purification Center



|              |  |
|--------------|--|
| Project name | Tataru River Basin Sewer Project<br>No. 2 Water Treatment Sand Filter No. 4 Machinery and Equipment Work |
| Capacity     | Sand filter basin: M50 x 8 tanks x 1 pond<br>Water treatment capacity: 10,700 m³ per day                 |
| Location     | Fukuoka Prefecture   |

#### ■ Miho Water Treatment Plant



|              |  |
|--------------|--|
| Project name | Water Treatment Equipment Work Phase 2, Miho Water Treatment Plant, Miho Village         |
| Capacity     | Sand filter basin: M50 x 2 tanks x 2 ponds<br>Water treatment capacity: 6,000 m³ per day |
| Location     | Ibaraki Prefecture   |

### ● Overseas energy plants

#### ■ TSM Power Co., Ltd.



|              |   |
|--------------|---|
| Project name | N-5000H Bagasse Fired Boiler  |
| Capacity     | Fuel: Bagasse No. of boilers: 2<br>Steam conditions: 150 tons per hour x 4.2 MPaG x 450°C |
| Location     | Udonthani, Thailand   |

#### ■ Mitr Phol Bio-Power(Phu Luang) Co., Ltd.



|              |   |
|--------------|---|
| Project name | N-4000H Bagasse Fired Boiler  |
| Capacity     | Fuel: Bagasse No. of boilers: 2<br>Steam conditions: 125 tons per hour x 4.2 MPaG x 485°C |
| Location     | Loei, Thailand  |



Report on Progress in CSR Activities for the Future and Future Plans

The global business environment in which Takuma pursues its core business in the environmental and energy fields is becoming increasingly diversified, and intense competition among industry players requires constant caution. Against this backdrop, the environmental science and new energy science development capabilities that we have cultivated over many years lie at the heart of our CSR management. These capabilities comprise our greatest strength in that they allow us to make broad contributions to society in the tumultuous times of the 21<sup>st</sup> century.

To become a sustainable, forward-looking company while fostering and expanding a broader range of CSR activities, we began compiling, implementing, and improving a CSR activity roadmap in FY2011. This section reports on the results of our activities in FY2012 and describes some of the activities we plan to pursue in FY2013.

Activity report for FY2012

Evaluation of the selection of important issues for FY2012

The following table evaluates our FY2012 plan and outlines remaining issues.

| Item   | Evaluation  | Remaining issues   |
|--|-------------|--|
| 1. We will categorize the short-term issues and the medium-term and long-term social issues for Takuma and choose important issues.  | Good        | We will identify, select, and offer support for department-specific action programs designed to spread awareness of and facilitate the implementation of important issues throughout the company.        |
| 2. We will decide upon an index to measure performance and thereby enable the PDCA* cycle to be implemented for future CSR activities.   | Fair        | We began formulating such an index during the previous fiscal year, but we failed to develop a practical quantitative and qualitative metric. We will continue discussions and develop a final proposal. |
| 3. To accelerate the permeation and awareness of companywide CSR activities, we will continue to hold Compliance and CSR Promotion Organization meetings and make use of CSR reports and in-house newsletters. | Good & Fair | We will continue to develop a companywide CSR environment. In particular, we will work to deepen and broaden our activities in the areas of compliance and risk management.                              |
| 4. We will conduct an internal survey based on the important issues we have identified.  | Poor        | We will conduct a survey to gauge internal awareness and implementation of important issues (to be conducted during the second half of 2013).  |

\* P (Plan: strategy, plan, goal) D (Do: implement, execute, record) C (Check: monitor, check, evaluate) A (Act: improve, reexamine)

Selecting important issues

The following important issues were selected after reviewing FY2012 operations:

Corporate governance

- 1. Leadership by top management
- 2. Corporate governance
- 3. Information disclosure (accountability and transparency)
- 4. Compliance
- 5. Risk management
- 6. Stakeholder engagement
- 7. Companywide CSR human resources development

Consumer issues

- 8. Safety and quality of products and services

Fairness in business

- 9. Fair transactions and relationships with customers, suppliers, and partners
- 10. Human rights and social and environmental aspects of the supply chain
- 11. Respect of property rights
- 12. Compliance with the Antimonopoly Act

Labor and human rights

- 13. Proper employment relationships and labor conditions (including health and safety, social dialog, etc.)
- 14. Development of employee skills
- 15. Respect for employee human rights

Environment

- 16. Implementation of environmental management structures and reduction of environmental impacts
- 17. Contribution to resolution of environmental issues

Community engagement and development

- 18. Impact of business activities on local communities and society
- 19. Community service activities

Activities scheduled for FY2013

We evaluated and studied our activities during FY2012 in order to determine the content of our activities in FY2013.

Activities concretely scheduled for FY2013

- 1. To expand on the important issues chosen for FY2012 internally, we will not only clarify their significance by visualizing each issue in a hierarchical structure, but also educate employees to create an understanding of why issues were chosen, how the company should conduct itself, and what should be done as a result. In this way, we will offer support for the formulation of companywide and department-specific priority action programs.
  - 2. We will study indexes for measuring performance so that the PDCA cycle can be implemented for future CSR activities in order to address each important issue.
  - 3. To accelerate the spread of companywide CSR activities and associated education on an ongoing basis, we will deepen and expand these activities by continuing to hold Compliance and CSR Promotion Organization meetings and by publishing CSR reports and in-house newsletters. We will also link various activities throughout the company in an organic manner to bring the issues to the surface and increase our overall ability to deal with them.
  - 4. We will conduct an internal survey during the second half of the year with the objective of offering support for identifying companywide and department-specific priority action programs as described in items 1 and 2 above.

● CSR management outline detailing Takuma’s short-, medium-, and long-term activities

The following triangular diagram describes how Takuma practices CSR management to achieve short-, medium-, and long-term goals.

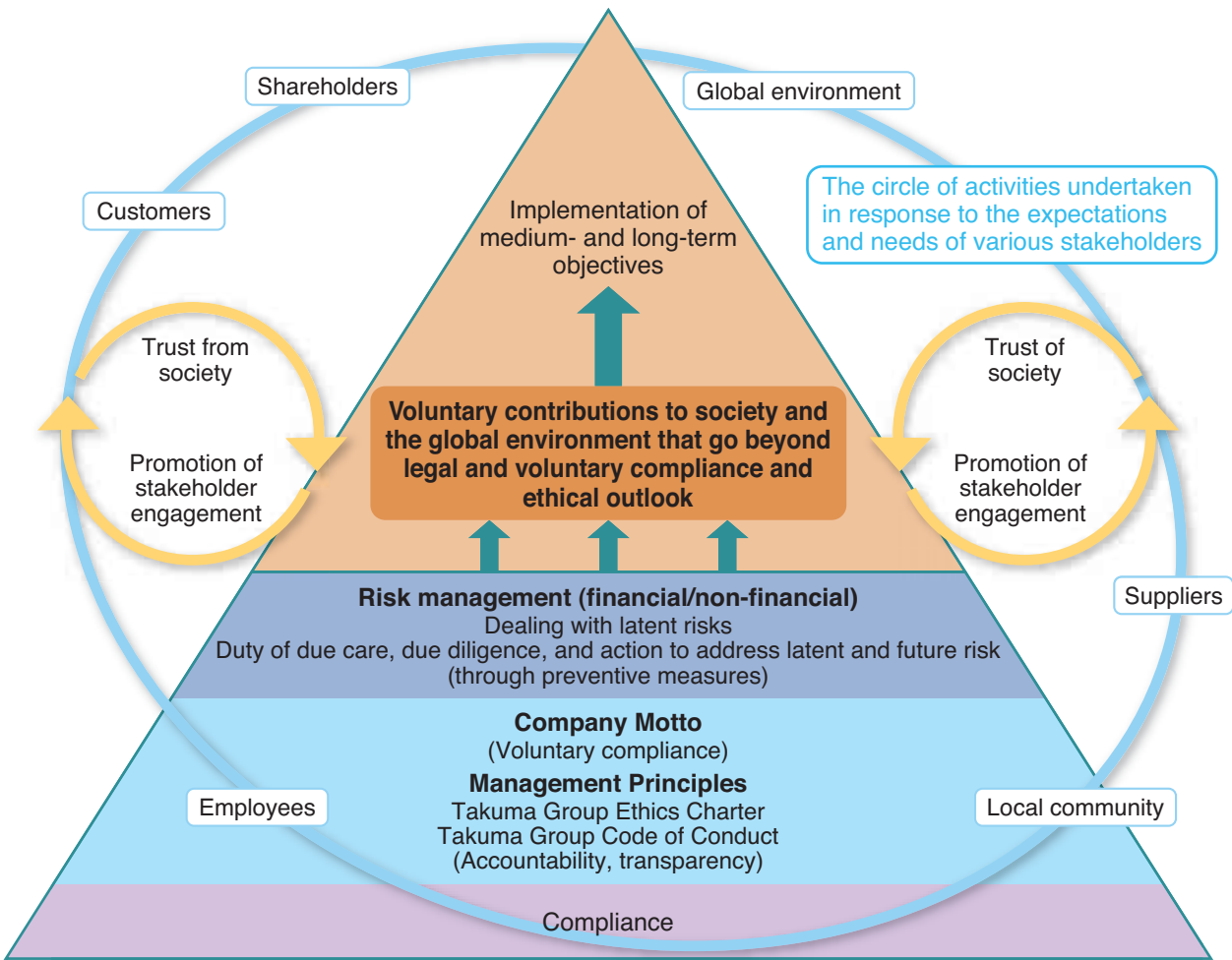
This outline is based on our Company Motto and framework, which underlie the activities it describes.

Reaching the apex of the triangle is not simple, but rather something that is accomplished one step at a time by steadily taking the time and expending the effort to work as hard as is possible in light of the company’s level of ability and resources. This outline serves as a guidepost pointing the way toward CSR and a sustained contribution to development through our business while coming together to increase our corporate competitiveness based on management-level leadership. The following explains its content one level at a time.

<Compliance>

The area of compliance consists of imperatives that the company must at a minimum put into practice. In addition to legal compliance with such laws and regulations as financial regulations, the Company Act, the Financial Instruments and Exchange Act, the Antimonopoly Act, and the Act against Delay in Payment of Subcontract Proceeds, Etc. to Subcontractors, compliance encompasses internal controls. The area of compliance comprises the very foundation of CSR management (the baseline of the triangle) and a statement of the minimum necessary social obligation and responsibility that must be practiced by the company in return for the recognition accorded it by the market and society.

Takuma’s CSR Management and Contributing to Sustained Development



<Company Motto, Management Principles, Ethics Charter, Code of Conduct>

Our company motto of “Value Technology, Value People, Value the Earth” encompasses an extremely broad and varied range of CSR areas, elements, and activities. In this outline, we have identified compliance as the group of items that holds the highest propriety for the company out of all the elements included in the motto. In short, the important compliance group targets the Ethics Charter and Code of Conduct (see page 4). We used to use the word “compliance” to include everything in the motto, but some of those elements properly belong to the CSR category that falls higher up in the triangle, making it necessary to draw a distinction. This CSR outline breaks down the term “compliance” into categories and organizes associated concepts in line with those areas.

<Risk management>

Since establishing the CSR Department in 2006, we have consistently focused our resources and attentiveness on companywide risk assessment activities in the areas of compliance and risk assessment. This comprehensive program has included articulating clear companywide policies; creating organizational structures; assigning and training personnel; offering education to ensure effectiveness; pursuing, managing, and evaluating the PDCA cycle; and making and reviewing improvements.

As globalization accelerates and the business environment becomes more unforgiving, it will be essential to manage risk in an efficacious and effective manner. In particular, Takuma cannot afford even a moment of carelessness in managing the risks that affect its stakeholders, which include local governments, communities, residents, and others. The keys to our approach to risk management are (1) identifying priority risk management areas for the entire company and thoroughly implementing management structures and specific implementation manuals; (2) sharing and managing information about changes in risks; (3) fostering organic connections among Takuma and its group companies, business divisions, employees, plants, and construction sites to facilitate self-management and initiative; and (4) implementing forward-looking preventive measures while exercising due care and diligence. Although leadership from top management, companywide organizational structures, and management rules and manuals play an important role, we believe that the most critical factor is each and every employee’s stance and mindset with regard to risk management.

<Contributions that go beyond compliance and an ethical outlook>

The half-triangle at the top of the outline indicates the category of voluntary contributions to society and the global environment that go beyond legal and voluntary compliance and ethical outlook. Because this uppermost area is normally expressed using terminology associated with a broad range of concepts and fields, there are many options for its content, and it is important that companies take the initiative to choose their own priority issues. As a straightforward example, our Company Motto of “Value Technology, Value People, Value the Earth” is an example of an expression that signifies this uppermost category. The ideals of good corporate citizenship and harmony with society as expressed in our Ethics Charter and Code of Conduct are also concepts that belong in this uppermost area. For example, the description in the Ethics Charter about good corporate citizenship states, “We shall strive for proactive social contribution while establishing a harmonious coexistence with the global environment as good corporate citizens.”

The CSR triangular framework diagram was created to organize concepts and terminology such as these to create a shared understanding within the company as part of an ongoing effort to formulate a series of guidelines on future CSR activities.

**Note: The circle of activities undertaken in response to the expectations and needs of various stakeholders**

The outline encompasses stakeholders such as shareholders, customers, suppliers, employees, and local communities. The resulting circle is shown in the figure as the “circle of activities undertaken in response to the expectations and needs of various stakeholders.” The two-way dialog initiated to meet stakeholder expectations and needs comprises stakeholder engagement. Earning the trust of society through the pursuit of stakeholder engagement reflects common awareness and practice throughout the world, including in Japan.



We recently held a stakeholder dialog with a number of experts who have detailed knowledge of Takuma's businesses in order to facilitate communication with stakeholders.

Participants from Takuma:  
Yoshitada Kakuta    Manager, Energy and Environmental Development Department and Technology Planning & Administration Department  
Tomohiko Hirao    Assistant Manager, CSR Department

— Masazi Okuyama  
Managing Director, The Japan Society of Industrial Machinery Manufacturers



On the transformation of the market in the environmental systems industry

Mr. Okuyama: Looking back on the transformation of the market in the environmental systems industry, the industry experienced a high rate of growth in order to comply with environmental regulations such as the Basic Act for Environmental Pollution Control, the Air Pollution Control Act, and the Water Pollution Control Act as industrial pollution began to manifest itself starting during the second half of the 1950s, which was a period of rapid economic growth in Japan. From the 1960s to the 1980s, the market grew rapidly due to the development and spread of new technologies, incentives implemented by the government, and other financial support. From 1980 to 2000, the environmental systems industry enjoyed steady growth as the focus shifted from preventing pollution to conserving the environment amid developments such as strengthened regulations, preferential policies, subsidies for technological development, and the development of environmental infrastructure through public investment. In 2001, regulations targeting dioxin emissions led to improvements and updates of existing city garbage incinerators and construction of new incinerators, pushing the total value of environmental systems production to an historic high. However,

that figure subsequently fell for nine consecutive years due to a rapid falloff in demand from government agencies, which generate the bulk of orders, as well as slowing private-sector capital investment and the completion of most of the environmental infrastructure development that had needed to be done. By FY2010, the market had contracted to one-third of its peak size. As a result, I feel that the businesses pursued by environmental systems manufacturers are changing. It seems these companies are shifting into new fields.

Future prospects of the environmental systems industry

Mr. Kakuta: Specifically, what are some of these new fields?  
Mr. Okuyama: Manufacturers are expanding into new energy fields such as biomass. My sense is that they are gradually shifting from the environment to energy. Additionally, the Ministry of Economy, Trade and Industry is setting forth a policy that states infrastructure businesses should generate profits while contributing to society based on the keywords of safety and security. While environmental systems were originally an infrastructure business, the Japan Society of Industrial Machinery Manufacturers believes that there may be new business models for the environmental systems industry from the standpoint of social businesses based on measures that address social issues such as the aging of the population and the low birthrate. By some estimates, England's social business market is more than 20 times larger than Japan's.  
Mr. Kakuta: Takuma has taken "environment" and "energy" as its keywords. It goes without saying that these areas cannot be pursued in a manner that is unrelated to social business.  
Mr. Okuyama: Companies should pursue a business model that emphasizes contributing to society while making a profit, since they have to make money in order to continue to exist. In that sense, in the future the

business domain should be properly understood to be the "environmental industry" rather than environmental systems.

Mr. Kakuta: Until now, pollution-preventing equipment and related products have served as a "venous industry," that is to say, one that facilitates the recycling of waste, but you're saying that something must serve as an arterial industry.

Mr. Okuyama: I feel that withdrawing from the environmental systems industry because it's not profitable is unacceptable from a social responsibility standpoint, and that environmental systems manufacturers are subject to a high level of expectations and responsibilities. I think Takuma is fulfilling its responsibility and contributing to society through its biomass boilers.

Mr. Kakuta: Demand for wood biomass boilers is increasing as a result of the feed-in tariff system (see page 23).  
Mr. Okuyama: At the same time, I also think it's necessary to look toward overseas markets. Doing business overseas presents certain issues, caused by obstructions in other countries as well as issues on the Japanese side, for example insufficient personnel and know-how, high product costs, and the lack of local networks. Nevertheless, it's important to accept the way things are economically and technologically as well as culturally. Additionally, doing business in emerging nations requires development of technologies for emerging nations as well as human resources development and exchanges. At the same time, it is important to propose entire systems, including not only equipment and hardware, but also such components as project operations, planning, maintenance, and management.  
Mr. Kakuta: We have operational, maintenance, and management know-how in Japan, but there are issues in terms of how well we're making use of them. The maintenance business has the advantage of allowing us to train people.  
Mr. Okuyama: As I've suggested in Ministry of the Environment meetings, there must be mechanisms to teach not only technologies, but also maintenance.



Requests for Takuma

Mr. Hirao: Could you tell us about your future expectations for Takuma and areas where you'd like to see improvement?  
Mr. Okuyama: Takuma and the Japan Society of Industrial Machinery Manufacturers have a deep, longstanding relationship, and I am deeply grateful for your support. I visited K City the other day and was told they find not only your technology, but also Takuma as a company, trustworthy. They were adamant that that you are more sincere than any other company they deal with, that you respond quickly to their requests, and that they feel peace of mind when they entrust projects to you. I feel that you deal with the Society in the same serious manner. I think Takuma has a wonderful, sincere organizational culture that can be trusted, but the flip side of those characteristics is an impression that you're a bit conservative. Why not more actively embrace the challenge of new fields? I have particularly high expectations for you because you're one of only a few manufacturers in Japan that specialize in environmental systems. The Society's view is that the government's support will be essential in order for the environmental industry to grow and develop. In the future, I look forward to proposing partnerships between private-sector companies and government agencies, particularly the Ministry of Economy, Trade and Industry.

Response from Takuma

As a pioneer in environmental systems, we have been involved in waste treatment since our founding. Conditions have become extremely complex around the world in recent years, and we feel that we have witnessed the dawn of an era when it is difficult to trace out a vision for the environmental systems business. You have pointed out that future growth will be impossible unless we embrace the challenge of new fields. Going forward, we will continue to contribute to society without losing our pioneering spirit.

— Yoshio Yagi

Executive Director, Japan Waste Management & 3R Research Foundation



### On the Great East Japan Earthquake

Mr. Yagi: Two years have already passed since the Great East Japan Earthquake, and while the journey toward reconstruction in affected areas has begun, I sense that there are fewer articles on the subject in newspapers recently. There are limits to people's memory. Since tragic earthquakes and even war experiences of the past weather as the years go by, it is necessary to leave a record of the Great East Japan Earthquake for future generations. When I visited sites affected by the disaster in Arahama in the city of Sendai in June 2011, I learned that the 20-meter Adventure Hill had saved many lives, and I immediately wondered whether there were any initiatives to create a monument, for example by building a hill that would combine processing of the enormous quantity of debris created by the earthquake while serving as a place in which people could seek shelter in the event of another tsunami.

Mr. Kakuta: Are you saying that we have to adopt a different approach to processing debris from the Great East Japan Earthquake than has been used in the past?

Mr. Yagi: Because the Great East Japan Earthquake was accompanied by a tsunami, it did an enormous amount of damage. Reconstruction efforts require huge amounts of earthwork materials for building embankments in the course of constructing seawalls and breakwaters, raising levees around residential areas, and relocating houses to higher ground. If this is the case, I believe we should

focus on ways to turn debris into the earthwork materials that we need in partnership with civil engineering companies. If, for example, in the course of constructing seawalls, breakwaters, higher-elevation shelters, and other projects it is possible to build concrete structures whose strength and water-tightness are on par with isolated-type waste treatment sites, then it would be possible with a little innovation to add functionality so that these structures could serve as disposal sites. Furthermore, examples such as treatment to contain organic mercury in Minamata Bay may provide useful clues for how to deal with harmful treatment residue.

Mr. Kakuta: Such an approach would bring Japan's technological strengths to bear on the reconstruction process.

Mr. Yagi: First, it is necessary to carefully assess the differences between the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake. While the radius of damage of the former, which struck locally directly underneath the city, was about 30 kilometers centered on Kobe, the latter, which originated in a deep-ocean trench, caused damage that extended over about 500 kilometers. Moreover, recovery has been complicated by a lack of manpower and clear reconstruction plans because the disaster affected areas with small local governments (other than the city of Sendai) as well as depopulated areas.

Mr. Kakuta: I hear that the numbers being discussed in the context of the disaster recovery are based on the Great Hanshin-Awaji Earthquake.

Mr. Yagi: Because that earthquake struck a large urban area and caused damage that was limited in geographic scope, we were able to recover quickly—in about three years. However, the size of the area affected by the Great East Japan Earthquake coupled with the number of victims of the tsunami and factors such as the time it took to recover bodies resulted in a delayed initial response, making it difficult to accelerate the processing of debris.

Mr. Kakuta: They've had a hard time of it in the affected areas.

Mr. Yagi: Because the debris from the earthquake was caused by a natural disaster instead of being generated by business activities, it is considered general waste, and according to the law, processors of general waste licensed by city, town, and village mayors will be tasked with its disposal. In actuality, industrial waste processors licensed by prefectural governors to handle a variety of industrial waste products could make a contribution to this effort, but I think conditions were not such that these processors were fully utilized in cities, towns, and villages other than the large cities such as Sendai that have the ability to administer industrial waste policy. Consequently, the task fell to prefectures with little actual experience in this area and to

the national government, and I think that made it inevitable that the response would be a slow one. I may be making a logical leap here, but due to limits on how much can be accomplished by initiatives undertaken on the normal governmental basis in the event of a major earthquake, it may be necessary to enact a law outlining special measures that allow the designation of special disaster zones so that the capabilities of the private sector, which is well versed in crisis management, can be fully utilized.



### On overseas strategy

Mr. Kakuta: Could you discuss other recent topics?

Mr. Yagi: I have also investigated how Japanese technology and experience relating to waste and the 3Rs can be communicated overseas. Since Japan's technology concerning waste and the 3Rs is the world's best, the Japanese side is prone to assume that it will be accepted everywhere in the world. However, for example, while facilities for treating leachate must be built at final disposal sites in Japan due to the country's large amount of rainfall, there is no need for such facilities in the arid regions of interior Asia, where heat is more of a concern than rainfall. Additionally, the distinction between usable and unusable (waste) materials varies with the level of economic development. I think you first have to understand that there are differences between Japan and other countries in terms of climate, custom, culture, and history. Failure to do so means facilities constructed through Japanese ODA cooperation and other means may go unused.

Mr. Kakuta: So there are limits to applying domestic business models overseas.

Mr. Yagi: Japanese local governments tend to accept high-end, high-cost facilities with service guarantees from the manufacturer but to falter on maintenance costs. In other countries, it's standard to clarify the extent of manufacturer guarantees and to pursue a rational cost basis for such projects. The author Saburo Shiroyama said, "What's common sense in Japan is not common sense elsewhere in the world. And what's common sense elsewhere in the world is not common sense in Japan." Along the same lines, I don't think you can simply bring Japanese business practices to other countries and succeed. When European and American companies enter markets in Asia where there are cultural and religious differences, I understand they send their most talented people. Perhaps because we admire Europe and the U.S., Japan sends its talented people there. I think we have to change our basic approach.

Mr. Kakuta: Japanese companies find themselves facing challenging circumstances when they attempt to enter the European and American markets.

Mr. Yagi: Indeed, because these are contract-driven societies where tacit understandings don't rule the day.

### Requests for Takuma

Mr. Hirao: Could you tell us about your future expectations for Takuma and areas where you'd like to see improvement?

Mr. Yagi: Takuma is a leading manufacturer specializing in the environmental systems field. You have many strengths and wonderful capabilities as a specialized manufacturer, but in the future, it seems likely that there will be limits to what a single company can accomplish when actively pursuing overseas businesses and expanding domestic businesses. I think considering partnerships and alliances within the industry will lead to increased competitiveness both inside and outside Japan.

### Response from Takuma

The Great East Japan Earthquake caused major damage, in excess of that of the Great Hanshin-Awaji Earthquake. As we work to resolve debris-related issues through temporary incinerators and other means, we have felt that memories of the earthquake are fading. This dialog has impressed upon us the fact that it is our mission to continue to communicate memories of the Great East Japan Earthquake to the public. Going forward, we will continue to work hard as an environmental systems manufacturer in accordance with our awareness of our responsibilities as a member of society.

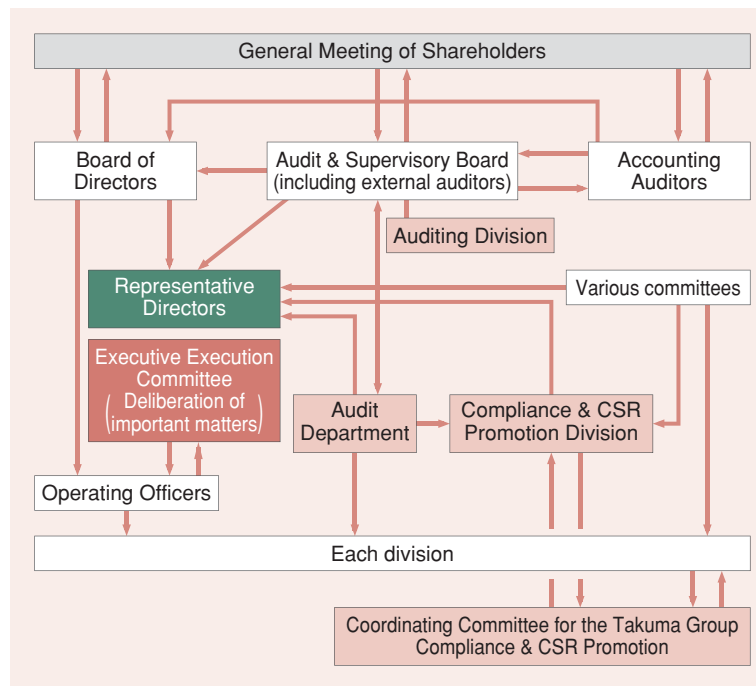


## Corporate Governance

In order to accelerate management decision-making and clarify where management responsibilities are placed, we have adopted an operating officer system in which we appoint operating officers who are entrusted with the responsibility to execute our business activities. The Board of Directors meets regularly once a month as a rule and whenever else it is necessary to make decisions about important issues related to business management and issues established by law, as well as to oversee the execution of the directors' duties. Moreover, we have also established an Executive Execution Committee, which is chaired by the president/chief operating officer, as an organization that deliberates matters that are brought up at meetings of the Board of Directors and other important issues related to the execution of our business activities. This committee communicates and provides direction about items decided by the Board of Directors and other important items related to the execution of our business activities appropriately to the divisions that are to execute them.

As of March 31, 2013, the Board of Directors was comprised of 8 members, and 13 operating officers (including some who are also directors) had also been appointed.

For corporate auditing, we have adopted an auditor system, and our Audit & Supervisory Board, which consists of four auditors, including two auditors from outside the company, is in charge of it. Auditors attend important meetings, including those of the Board of Directors and the Executive Execution Committee, and they strive to understand and observe the status of business execution in a timely and appropriate manner. They express their opinions as necessary, and they conduct strict auditing of the business execution performed by the directors. This includes conducting self-assessments and evaluations related to the internal control system by operating officers at the end of each term. Furthermore, they receive reports from accounting auditors and the Audit Department about auditing plans, the status of auditing and other issues and otherwise conduct regular information exchanges. They cooperate together as they do this and undertake auditing of every business place, division and subsidiary company in accordance with the auditing policies, divisions of work and other stipulations established by the Audit & Supervisory Board. We also work to facilitate communication and information exchange with directors, auditors, and other personnel at subsidiaries, from whom we solicit reports on business operations as necessary.



## Internal Control

In accordance with the Companies Act, the Basic Policy for Establishment of an Internal Control System (full text is available on the Web) was adopted at the Board of Directors' meeting in May 2006. We continue to review and improve this policy in response to changing circumstances.

Working towards thorough compliance, Takuma built a compliance promotion organization in FY2006 in order to continuously implement enlightenment and educational activities that make corporate ethics, related laws and ordinances, and internal rules fully understood. To control the danger of loss, we have also prepared a “Risk Management Code” that determines the person in charge of each risk, and we set up our risk management organization according to that Code. When the unexpected occurs, emergency headquarters are established with the company president as the Director in charge of risk

management, and an organization is put in place in order to minimize and prevent further damage through prompt action.

In this way, we are working to ensure thorough compliance while carrying out business properly and efficiently while also deepening risk management.

We also strive for awareness and education in each Group company through our “Takuma Group Coordinating Committee for Compliance and CSR Promotion”, so that management of both compliance and risk is realized throughout the whole of the Takuma Group.

Internal control, constructed and evaluated in order to report on and prevent misstatements in our financial reporting, is based on the Financial Instruments and Exchange Law. This internal control on financial reporting for the Group has resulted in reports that indicate this system has been effective.

## Risk Management Structure

Takuma follows a “Risk Management Policy” that connects company-wide risks and separately classifies them into “project risks” related to our core business, i.e., plant construction, “DBO project risks” and “DBO project operation, maintenance and management risks” related to our DBO business, and “potential risks”, “actualized risks”, and “financial reporting risks” related to other corporate business activities.

We are also building the risk management organization shown below and constructing a system of risk management and promoting the strengthening of management for group companies as well through our “Takuma Group Coordinating Committee for Compliance and CSR Promotion”.

## Risk Management Policy

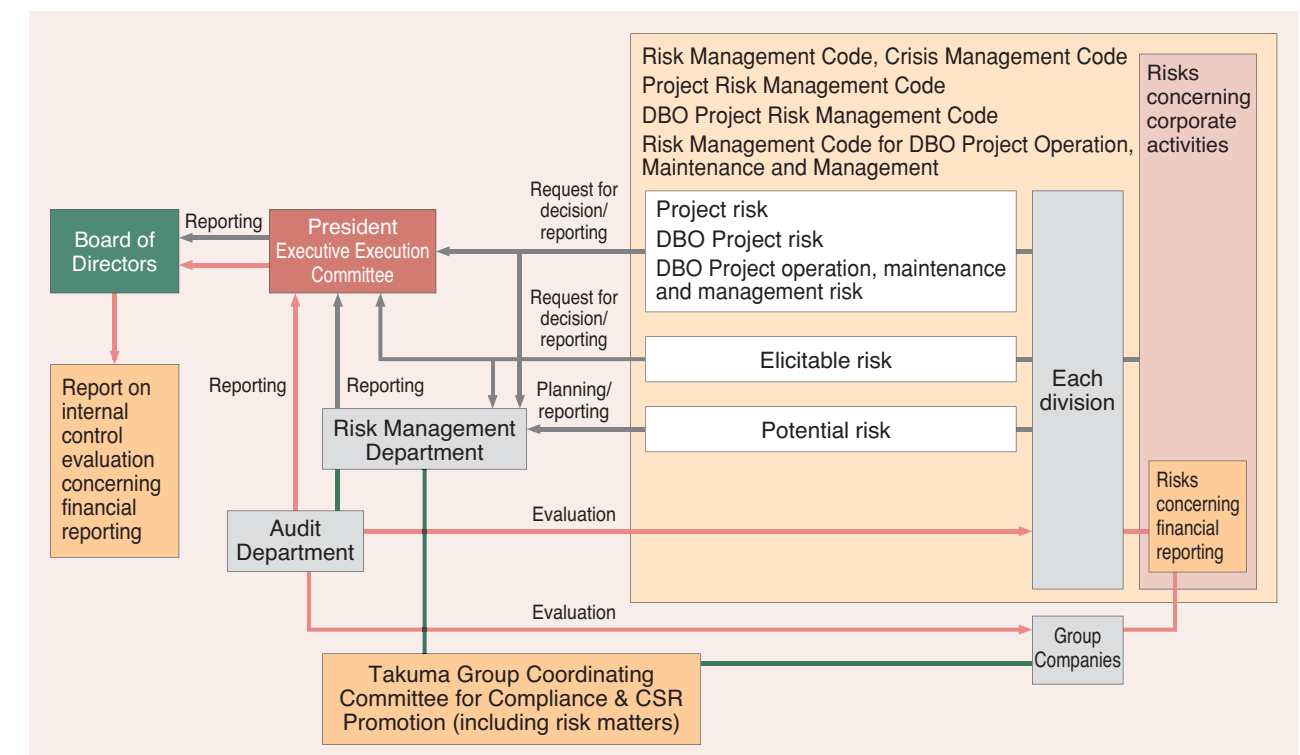
### Basic purpose of risk management

Risk refers to all phenomena that interfere with the group's ability to achieve its business objectives or cause losses or harm to the interests of stakeholders.

The Takuma Group practices risk management with the goal of increasing its corporate value by working to maximize returns while minimizing the negative impacts of risk.

### Risk management action guidelines

1. The president and CEO is responsible for risk management at Takuma.
2. All officers and employees participate in risk management activities.
3. Risk management activities are carried out in accordance with applicable guidelines such as the Risk Management Rules.
4. Risk management activities are carried out in line with the Mid-term Management Plan and annual plan, and we work to make improvements on an ongoing basis.
5. When risk manifests itself, we respond by taking responsible action quickly to minimize any damage and creating provisional organizational entities as necessary.
6. Group companies carry out risk management activities in accordance with their own policies and plans, with support from Takuma.



## Compliance & CSR Promotion Structure

Led by the department in charge of compliance and CSR promotion (CSR Department), Takuma aims at encouraging that activity through the “Compliance and CSR Promotion Organization” that was installed for the purpose of enabling compliance and CSR to concretely permeate company-wide through an in-house organization.

This organization is composed of Chairman (the General Manager Compliance & CSR Promotion Division), the Secretariat (positioned in the CSR Department), and an executing organization in each headquarter and department.

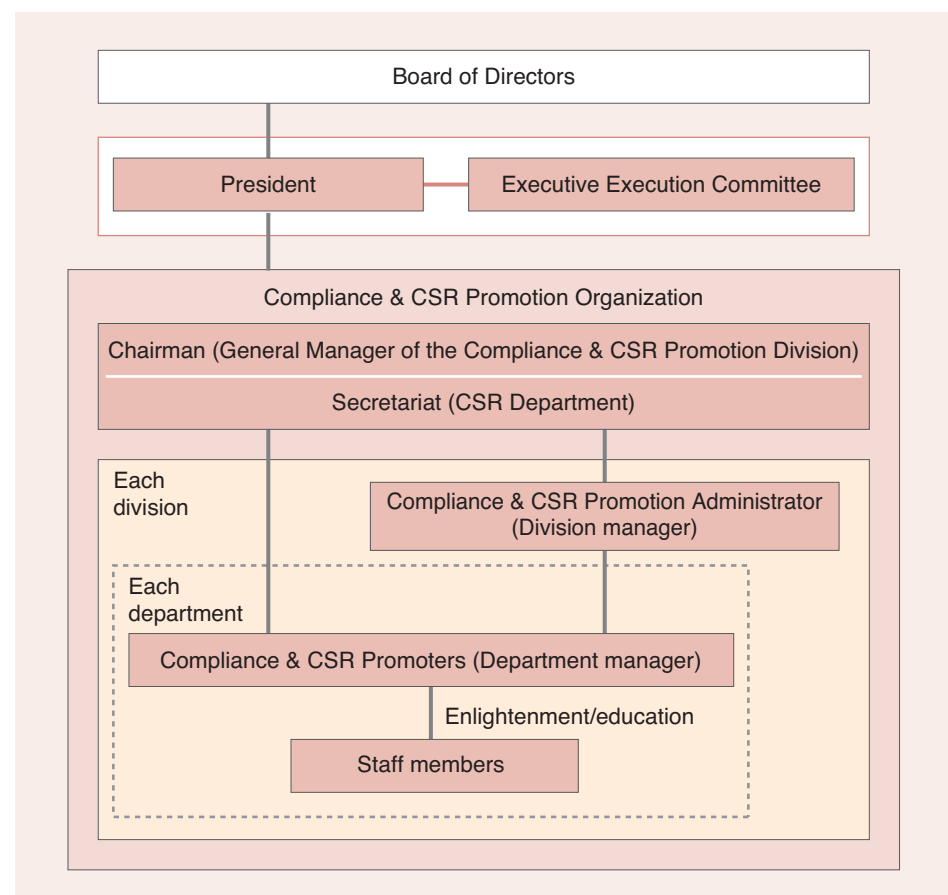
As the person in charge of promoting compliance and CSR in his or her division, each division manager is appointed as a “Compliance and CSR Promotion Administrator”. As persons who implement awareness and education in compliance and CSR in their respective departments, department managers are appointed as “Compliance and CSR Promoters”.

The meetings conducted within this mechanism include “regular meetings” and “departmental meetings”.

Regular meetings are held once a year. The person in charge of promotion receives reports on the status of compliance and CSR promotion company-wide, as well as on the status of the implementation of compliance and CSR promotion education for the past year, etc., and participants deliberate on a promotion plan of the current fiscal year.

Promotion members convene departmental meetings about once a quarter, with educational training aiming at the permeation of compliance and CSR in each department carried out. After departmental meetings, promotion members implement compliance and CSR promotion education in their respective department using training materials or in-house educational materials, and report the result to the Secretariat.

(Details of the compliance and CSR promotion education implemented in FY2012 can be found on page 61.)



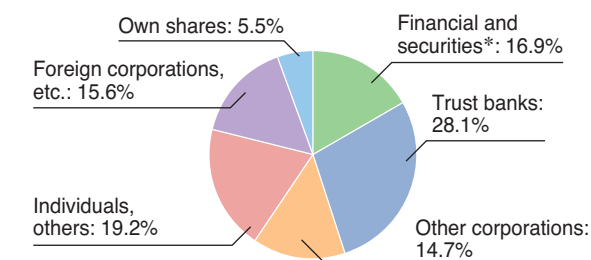
Compliance & CSR promotion structure diagram

## IR Activities

In keeping with the “Takuma Group Code of Conduct”, we provide our shareholders and investors with accurate corporate information in a timely and fair manner. As a part of this, we provide notifications on the convening of General Meetings of Shareholders, balance sheet information, timely disclosure information, marketable securities reports, annual reports in English and other business information, all on our website.

[Takuma website > IR information]

<http://www.takuma.co.jp/english/investor/index.html>



\* Banks, life insurance companies, nonlife insurance companies, securities firms, and other financial institutions

Composition of shareholders (as of March 31, 2013)

## BCP (Business Continuity Plan)

Important work at Takuma includes the maintenance of our BCP (Business Continuity Plan) that is based on preventing business from being interrupted due to a disaster or an unexpected accident, and then recovering from that in the shortest possible amount of time.

### ● Risk Management Code

Takuma has enacted a “Risk Management Code” that provides measures for dealing with unexpected events, such as an earthquakes, fires, or accidents, that occur in our corporate activities both inside Japan and overseas, or major loss or disadvantage that demand company-wide measures.

### ● Overseas Risk Management Code

The “Overseas Risk Management Code” has been enacted to define the measures for risk management for employees on overseas business trips or posted abroad, etc.

### ● Disaster Prevention Management Code

Takuma’s “Disaster Prevention Management Code” was enacted to facilitate thorough in-house disaster prevention management, implementing disaster prevention measures in advance, and aiming at minimizing material damage and human injury when a disaster does occurs.

### ● Earthquake Countermeasure Manual

Our “Earthquake Countermeasure Manual” places priority on preserving employee safety and protecting employees’ lives. It defines the fundamental issues of disaster prevention, such as daily measures for maintaining and continuing corporate activity to the greatest extent possible, a code of conduct for when an earthquake does occur, the establishment of an Earthquake Response Headquarters, and more. This manual was revised in FY2011 to include measures in case of tsunamis, etc.

#### Basic Policy on Earthquake Countermeasures

- Place top priority on protecting human life.
- Protect company assets and aim at prompt resumption of business.
- Secure a budget for earthquake countermeasures and implement those measures.
- Continuously improve the Earthquake Countermeasure Manual.

### ● Typhoon (Storm and Flood Damage) Countermeasure Manual

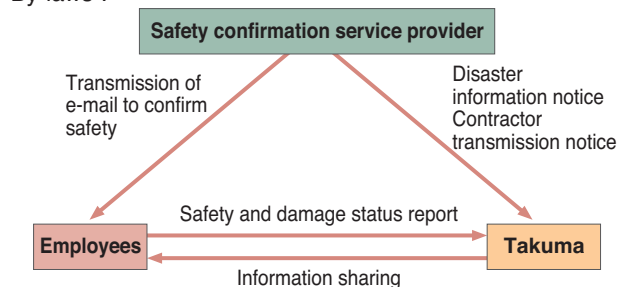
The “Typhoon (Storm and Flood Damage) Countermeasure Manual” is applied when a weather warning, such as a heavy rain, flooding, storm, and high tide, is issued due to the effect of a typhoon, etc., and there is a possibility that an office may suffer damage or that service may be stopped for some manner of commuting.

### ● Countermeasures against new forms of influenza

We have enacted “Countermeasures against new forms of influenza”, which aims at preserving employee safety and continuity of company business by defining the action principles, and the duties of both employees and the company itself, in case of a spread of infection, such as a new strain of influenza.

### ● Safety confirmation system administration

The “Safety confirmation system” was introduced in order to facilitate the confirmation of employees’ safety and for other urgent contact provided in the “Hazard Management Code”, “Earthquake Countermeasure Manual”, etc. The procedure for administering this system is defined under the “Safety Confirmation System Administration By-laws”.



When a massive earthquake strikes, e-mail is sent to specified persons and each one reports on the status of their safety and the surrounding disaster. This enables those in charge of internal control to promptly confirm each employee’s situation and share information with them.



Working with Our Employees

Approaches toward employees

Our company sets “establishing a work environment allowing each employee to challenge their goals, as well as getting on with their work through appropriate assessment” as its basic policy. Specifying the following three approaches as critical items, we introduce various systems for each.

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

● Objective Management System

We utilize an Objective Management System in which work objectives are set at the beginning of the fiscal year and the degree to which they are achieved is evaluated at the end of the fiscal year. The objectives, which are based on company policies, are decided through meetings and interviews with superiors to include the work tasks that each individual is to undertake over the year and the roles they are expected to fill.

During the fiscal year, we conduct “midpoint interviews” for everyone around the same time. In addition to regular confirmation and follow-up on the progress status of objectives, these promote communication between superiors and the employees that work under them and provide opportunities to deepen mutual understanding and trust.

● Work group transfer system

We have created a work group transfer system to facilitate movement from clerical and labor positions to the main career track so that motivated and skilled employees can pursue success regardless of their gender or academic background. We also provide opportunities for employees to be promoted to management positions.

● In-house commendation system

Every year on the anniversary of the company's founding on June 10, we recognize employees with the following awards:

- Takuma Prize\*
- Invention and idea commendations
- Qualifications acquisition commendations
- Takuma Technical Review Outstanding Paper Award
- Years-of-service commendations

\* The Takuma Prize is awarded to employees who have demonstrated outstanding achievements in their work or in their efforts on behalf of society outside of work, including lifesaving, disaster prevention, and volunteer service.



● Cafeteria plan

We introduced a cafeteria plan in FY2013 as an employee benefit program as part of our effort to meet the full range of diverse employee needs.

Employees can choose from a menu of programs including support for skill development, child-raising and nursing care, and health maintenance and promotion. The company then reimburses them for the cost of using those services, subject to an annual cap.

(2) Provide capacity building assistance to employees.

● Junior employee exhibition

As a part of the education of our junior staff, ten-year company employees give presentations that reflect on their experiences and indicate the future growth that they are looking for, and technological exhibitions are held for second-year employees in order to improve their ability to make presentations.

● Technical training sessions

We hold technical training sessions to provide opportunities for employees to increase their technical knowledge. These events range from inviting outside researchers or university professors to give lectures to having employees in technical positions give presentations on issues on which they're currently working.



● English education support

We administer the TOEIC test at the company twice every year to help employees improve their language skills. Employees who earn a high score are eligible to receive a bonus from the company.

● Support for earning qualifications

We reimburse employees for the costs of testing to earn public qualifications and licenses required for their jobs. We encourage employees to earn licenses and other qualifications as part of their skill development program, for example by offering bonuses to individuals who earn qualifications.

● Other systems

- New employee training
- General employee training
- Managers training
- Correspondence education programs

(3) Improve the work environment, facilitating employees' efforts to address business tasks without anxiety.

● Balancing work and private life

In order to maintain suitable working time periods, assure days off, and support diverse ways of working of our employees, we have incorporated systems for discretionary work, flextime, and half-days off. In addition to providing systems that enable nursing care leave for periods that exceed those specified by law, we have established a standard employer action plan in accordance with the Act on Advancement of Measures to Support Raising Next-generation Children. In this way, we are working to put in place systems that ensure employees are able to take full advantage of their abilities while balancing work and child-raising responsibilities.

● Employee health management

We work with the health insurance association and cafeteria operator to hold occasional Wellness Fairs.

In FY2012, we held fairs on the themes of “Preventing Lifestyle-related Diseases: Is Your Blood Healthy?” and “Osteoporosis: Are Your Bones Healthy?” These events offered educational content related to health management, including panel displays and individual diagnosis and guidance by a dietician.

[Employee health management measures]

- Improvement program for lifestyle-related diseases
- Lifestyle-related disease prevention checkups
- Mental health measures
- Health consultations
- Dissemination of health information (in-house newsletter and website)

● Labor-management relations

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

● Other enhancements to workplace environments

- Measures to counter sexual/power harassment
- Listening to opinions within the company\*

\* To enhance “ideal working conditions” for employees, our company absorbs a wide range of views from employees by placing an “opinion box,” as well as communication via e-mail and telephone concerning their working environments.

Recruitment

● Graduate recruitment

We implement the periodic recruitment of new graduates every year, from the perspectives of long-range outlook and human resource cultivation. As for the future recruitment, we will continue to implement fairer and more highly transparent recruitment activities via the provision of information, putting ourselves in the students' shoes.

● Internship

We have an internship program, accepting university and technical college students during their school summer breaks.

● Recruitment of handicapped persons

Currently, 10 handicapped employees are active in the company (as of April 1, 2013). We will continue to work to increase the employment rate of handicapped people, for example by participating in local job interview sessions, visiting schools, and welcoming visitors to experience what it's like to work at Takuma.

● Reemployment system for employees who have reached the mandatory retirement age

We have introduced a system that allows all retirees who wish to do so to work until age 65, and we have been providing employees who wish to work actively after retirement with the opportunities to continue playing an active role. As of April 1, 2013, Takuma has 43 such employees.

[Takuma website > Recruitment info]

<http://www.takuma.co.jp/saiyou/index.html>  
(content in Japanese)

Respect for Human Rights and the Abolition of Discrimination

Our company sets out its respect for basic human rights and prohibition of discriminatory acts in the Takuma Group Ethics Charter, Takuma Group Code of Conduct and labor regulations. In addition, we also support respect for human rights, without contributing to human rights violations, elimination of forced labor/child labor and the abolition of discrimination through participation in the UN Global Compact. We're also working to promote employment of disabled and elderly individuals.

● Takuma Group Ethics Charter (excerpt)

- 4. We shall respect fundamental human rights and never practice discrimination.

● Takuma Group Code of Conduct (excerpt)  
Respect for basic human rights

- 9. Prohibition of discriminatory actions
- 10. Respect of individuality, personal quality and privacy
- 11. Safe work environment

Efforts for Occupational Health and Safety

This year marks the eighth year since Takuma developed and began administering the Takuma Construction Occupational Health and Safety Management System (TK-COHSMS), which qualifies as an Occupational Safety and Health Management System (OSHMS) under Ministry of Health, Labour and Welfare programs.

During FY2012, we revised part of the TK-COHSMS to align it with revisions made to the Japan Construction Occupational Safety and Health Association’s construction occupational health and safety management system. We are working to prevent occupational accidents by actively making use of safe work procedures in risk assessment as outlined by the Revised Industrial Safety and Health Act in 2006.

During FY2013, we established three health and safety objectives in an effort to become a safer company through compliance with health- and safety-related laws, internal rules, and the Construction Business Act and other regulations: strengthening safety patrols, enhancing use of the safe work procedures, and offering health and safety education with the goal of improving skills.

Occupational safety and health activities and their results

1. Safety inspection system

We maintain a system where any construction or installation work starts only after the health and safety manager in each department inspects the safety and health plans for the construction or installation work prepared by our primary subcontractors, and then approves them.

- FY2012  
Number of safety inspections done: 161

2. Education for worksite representatives (safety and health education)

We continuously provide education to increase the levels of safety awareness of our employees and affiliated contractors.

- April 2004 to March 2013  
Cumulative number of trainees: 23,766  
Number of trainees passing the completion exam: 9,229



3. Safety patrols

Based on an annual Safety Patrol Plan, safety patrols are carried out by the Safety and Health Committee (comprised of committee members and advisors), and independent safety patrols are conducted by construction-related sections.

Safety patrols are based on safety inspection checklists and are designed to ensure worksite safety with an emphasis on offering safety-related guidance.

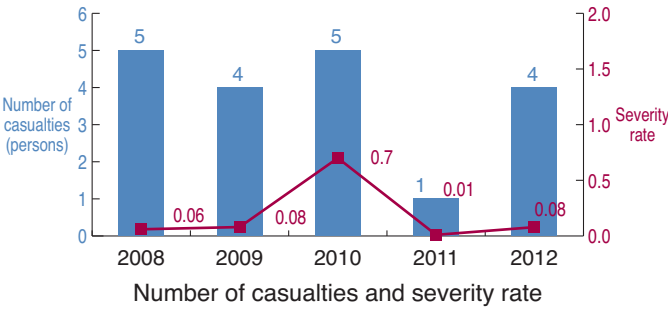
- Number of safety patrols implemented in FY2012  
By Safety and Health Committee (members, advisors): 81  
By Safety Control Department: 380  
By construction-related sections: 320



Safety results in recent years (number of casualties and severity rate)

Although the accident severity rate in 2011 fell because there was only one accident that resulted in a stoppage, the rate increased in 2012, when four such accidents occurred. Going forward, we will take an uncompromising approach to safety by redoubling our efforts to develop a robust safety management system.

\* Severity rate: An expression of the seriousness of accidents as the cumulative number of lost labor days per 1,000 total actual labor hours  
Severity rate = (Number of lost labor days / total actual labor hours) × 1,000



|         |      |
|---------|------|
| FY 2008 | 0.41 |
| FY 2009 | 0.14 |
| FY 2010 | 0.61 |
| FY 2011 | 0.21 |
| FY 2012 | 0.05 |

National average for the severity rate in the construction industry (general construction projects)

— Kanazawa Seibu Clean Center Construction Project receives prize for excellence as part of the 2012 “Awards from Minister for Health, Labour and Welfare for excellent workplaces, organizations and persons who have contributed related to occupational safety and health”

Takuma received a prize of excellence as part of the 2012 “Awards from Minister for Health, Labour and Welfare for excellent workplaces, organizations and persons who have contributed related to occupational safety and health”. An award ceremony was held on July 2, 2012, at Tokyo Kaikan (in Chiyoda-ku, Tokyo).

A total of ten worksites were recognized with prizes for excellence along with Takuma’s Kanazawa Seibu Clean Center Construction Project, including the Tokyo Gate Bridge (Kyoryu Bridge) construction project and the North Gate Building construction project (located across from Osaka Station).

In receiving the prize, which honors “exceptional worksites and organizations recognized as a model for others, for example due to an especially long period without any accidents or especially active efforts to reduce workplace risks,” each worksite was praised for its health and safety activities.

The honor recognizes efforts to prevent occupational accidents based on the TK-COHSMS system that Takuma has been implementing for many years, and we believe it signals that this system is outstanding on a nationwide level.



Project name: Kanazawa Seibu Clean Center Construction Project (currently, Kanazawa Seibu Environmental Energy Center)  
Location: Toriki-machi, Kanazawa City, Ishikawa Prefecture  
Dates: March 2009 to March 2012  
Zero-accident time: 761,000 hours



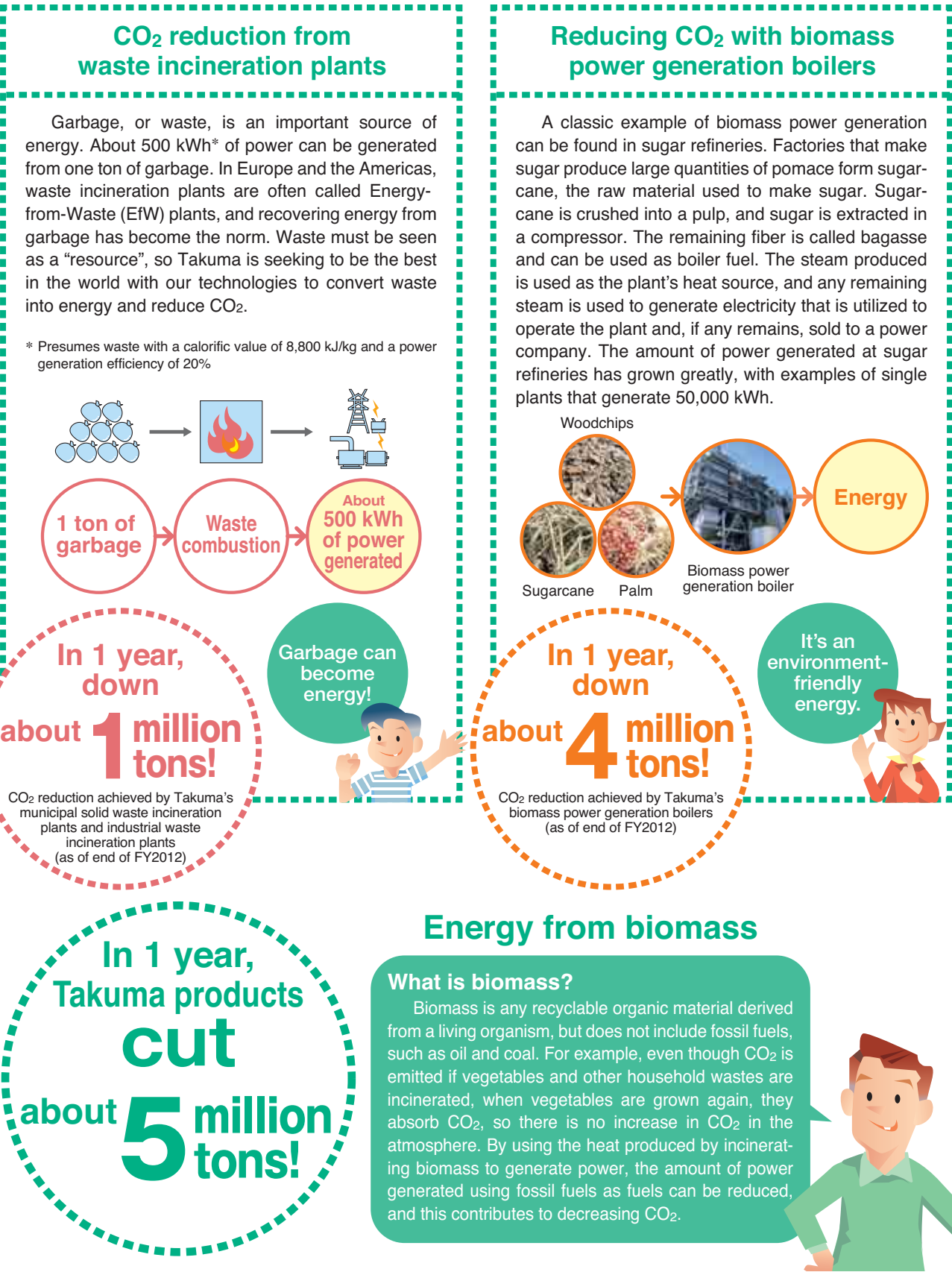
Minister of Health, Labour and Welfare Yoko Komiya presents a certificate of commendation to Shigeiro Shibakawa, General Manager of the Engineering Group, who represented Takuma at the award ceremony.





Takuma’s CO<sub>2</sub> Reduction Technologies

We convert waste/biomass into energy and reduce CO<sub>2</sub>!



Basic Environmental Policy

Our company has established the “Basic Environmental Policy” as follows; aiming to ensure employees contribute toward global environmental conservation. This basic policy applies to the activities of all company departments.

#### Environmental Philosophy

Takuma is committed to preserving the environment and realizing an affluent society through business activities under the Company Motto: “Value Technology, Value People, Value 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.
4. 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.

Environmental Objectives

#### Takuma Environmental Objectives

1. Takuma will reduce the amount of overall energy consumption by 30% compared to its level of FY2001 by FY2012.
2. Takuma will reduce the amount of CO<sub>2</sub> emissions by 30% compared to its level of FY2001 by FY2012.
3. Takuma will reduce the amount of waste generation by 30% compared to its level of FY2001 by FY2012.
4. Takuma will reduce the amount of final disposal of waste by 30% compared to its level of FY2001 by FY2012.
5. Takuma will achieve a rate of green purchase, such as office supplies, by more than 60% by FY2012.
6. Takuma will take all effective and possible environmental measures by controlling expenditures on the same.

We achieved targets 1 through 4 above but not target 5. (See the following page for more information.)

■ **Environmental Objectives for Group Companies**

In accordance with the establishment of our “Environmental Objectives,” our domestic group companies established their own “Environmental Objectives” and are striving toward efforts to reduce the environmental load.

Environmental Management

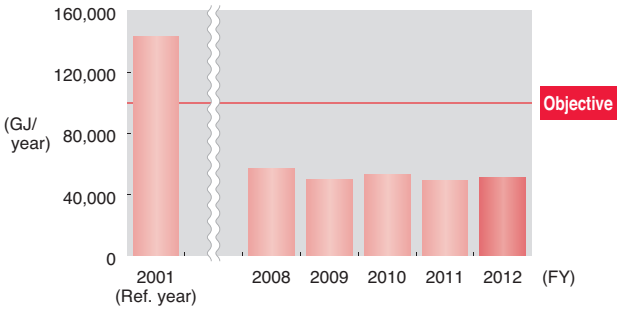
■ **The situation concerning the acquisition of ISO 14001**

Our Harima Factory has acquired ISO 14001 certification and has been implementing environmental management activities, based on the environmental management system established to comply with international standards. Our group companies Nippon Thermoener Co., Ltd., Takuma Technos Co., Ltd., and Dan-Takuma Technologies Inc. have also acquired ISO 14001 certification.

Environmental Data

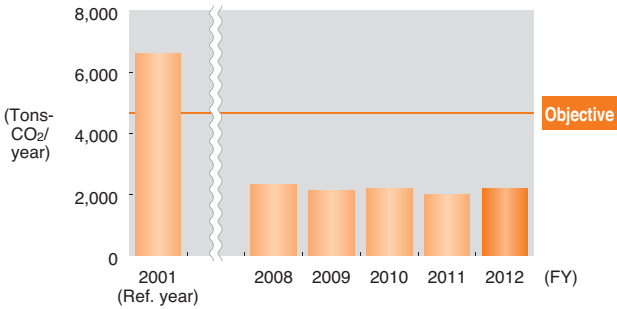
Objectives and achievements

● Total energy consumption



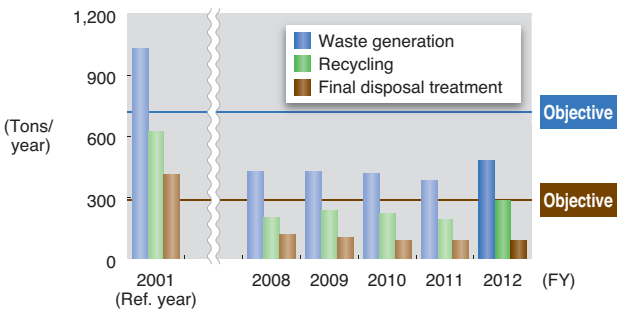
The total energy expenditure of the fuel and the electricity consumed at Takuma generally leveled off in comparison with FY2011 while also achieving our goals for FY2012. We will continue to promote energy savings from here on out.

● Greenhouse gas emissions



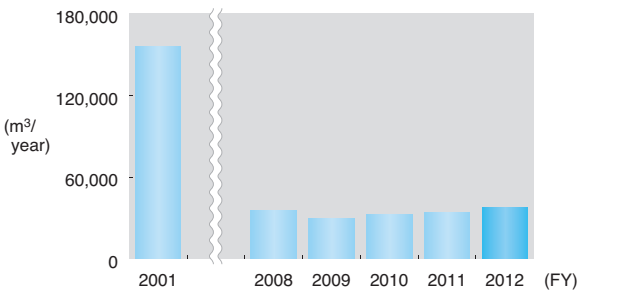
The greenhouse gas emissions created by our company are limited to carbon dioxide (CO<sub>2</sub>). The amount of CO<sub>2</sub> emissions in FY2012 was about the same as in FY2011, achieving our objective as well as the target total energy consumption. We will continue striving to reduce CO<sub>2</sub> emissions, both at offices and factories.

● Waste generation



Our 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.

● Water usage



Takuma's water consumption during FY2012 was largely unchanged from its level during FY2011. Going forward, we will continue to work to lower our water use.

● Green purchasing ratio

Our green purchasing ratio during FY2012 was 48.2%. Going forward, we will continue to work to improve this important metric.

PRTR emissions

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 report and register such chemical substances designated under Pollutant Release and Transfer Register (PRTR), in accordance with relevant laws and ordinances, with the local government.

● Dichloromethane (CAS No. 75-09-2)

Rustproofing paint on structural steel for boilers

| FY               | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|------|------|------|------|------|
| Emissions (tons) | 0    | 0.1  | 0    | 0    | 0    |

● Xylene (CAS No. 1330-20-7)

Rustproofing paint on boiler structures

| FY               | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|------|------|------|------|------|
| Emissions (tons) | 0.2  | 1.2  | 1.4  | 2.0  | 1.8  |

● Toluene (CAS No. 108-88-3)

Used for chemical analyses inside analytical laboratories

| FY               | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|------|------|------|------|------|
| Emissions (tons) | 0.4  | 0.1  | 0.03 | 0.06 | 0.05 |

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

Environmental Accounting

In FY2006, we introduced and disclosed our own environmental accounting system; based on the “Environmental Accounting Guidelines 2005 issued by the Ministry of the Environment.” As our business activities mainly involve environmental conservation plants and its equipment, Takuma Group employees have a significant awareness of the need for environmental conservation and we have been implementing approaches toward such issues within the Takuma Group.

Environmental conservation cost

| Item                                    | Investment (thousand JPY) | Costs (thousand JPY) |
|---|---------------------------|----------------------|
| Business area costs                     |                           |                      |
| Pollution prevention costs              | —                         | 23,086               |
| Global environmental conservation costs | 155,749                   | 6,569                |
| Resource recycling costs                | 1,602                     | 14,626               |
| Management activity costs               | —                         | 24,479               |
| Research and development costs          | 8,688                     | 1,075,075            |
| Social activity costs                   | —                         | 10,858               |
| Total                                   | 166,039                   | 1,154,693            |

Environmental conservation effect

| Item   | FY 2011 | FY 2012 |
|--|---------|---------|
| (1) Environmental conservation effect concerning resources input for business activities                           |         |         |
| Total energy input (GJ)  | 112,764 | 107,701 |
| Water resources input (m <sup>3</sup> )  | 60,166  | 63,750  |
| (2) Environmental conservation effect concerning environmental loads and wastes created by the business activities |         |         |
| Greenhouse gas emission volume (tons-CO <sub>2</sub> )   | 4,804   | 4,580   |
| Waste generation (tons)  | 972     | 1,104   |
| Final disposal volume (tons)   | 126     | 130     |
| Total drainage volume (m <sup>3</sup> )  | 58,871  | 58,522  |
| BOD emissions (kg)   | 3,229   | 3,134   |
| COD emissions (kg)   | 3,453   | 3,348   |
| T-N emissions (kg)   | 857     | 832     |
| T-P emissions (kg)   | 149     | 144     |

Scope of data collected

● Period covered: April 1, 2012 to March 31, 2013

● Companies targeted: [12 domestic companies]

Takuma Co., Ltd. (the Head Office, other offices including overseas sites and the Harima Factory), Nippon Thermoener Co., Ltd., Takuma Technos Co., Ltd., Hokkaido Sanitary Maintenance Co., Ltd., Takuma Technos Hokkaido Co., Ltd., Sun Plant Co., Ltd., Takuma Engineering Co., Ltd., Takuma System Control Co., Ltd., Dan-Takuma Technologies Inc., Kyoritsu Setsubi Co., Ltd., Kankyo Sol-Tech Co., Ltd., and Takuma Plant Service Co., Ltd.

[2 overseas subsidiaries]

Taiden Environtech Co., Ltd., and SIAM TAKUMA Co., Ltd.

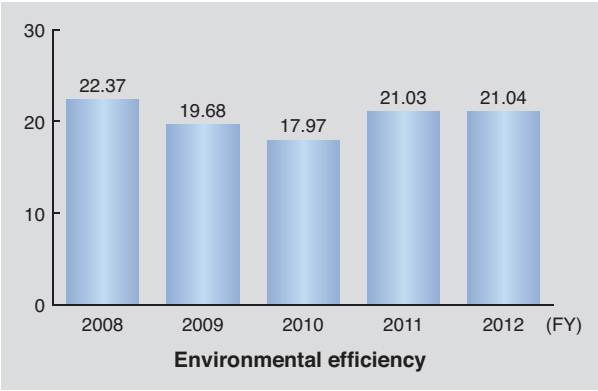
Environmental Efficiency

“As for environmental loads, there is a need for business organizations to reduce their gross volumes. However, approaches toward high economic efficiency are also required from a business management perspective. Consequently, when comprehending and evaluating environmental performance as well as approaches toward the environment implemented by business organizations, it is important to comprehend and manage an index indicating the efficiency of their approaches toward the environment, while also reflecting the economic value they produce, as well as an index indicating the total loading dose.” (Environmental Performance Indicators Guideline for Organizations—Fiscal Year 2002 Version—: Ministry of the Environment)

At Takuma, we calculate our environmental efficiency in response to the demands of the times. Our performance in this area was about the same during FY2012 as it was in FY2011.

Definition of our environmental efficiency

$$\frac{\text{Consolidated net sales (million JPY)}}{\text{Greenhouse gas emissions (tons-CO}_2\text{)}}$$





Compliance/CSR Promotion Education

During FY2012, we implemented education on compliance and CSR promotion in four separate stages through the following activity policies, which derive from our belief, outlined in our Compliance Declaration, that “it is absolutely up to individual members to practice such compliance”:

- i) Education is intended to stimulate individuals to think for themselves and act in a sincere and ethical manner.
- ii) Educational opportunities provide chances to create a better work environment, enrich workplace communication, and improve individual motivation.

1st term: Companies and ethics

We offered education focusing on alteration and falsification of documents based on examples of incidents from other companies.

After the session, each department discussed what practices should be implemented by individuals to avoid illegal activity such as the alteration, fabrication, or falsification of internal documents and records as well as of documents submitted to outside parties.

3rd term: Managing trade secrets to protect confidential information while using it to strengthen the company

Our 10th Mid-Term Management Plan identifies the need to develop a cyclical system to accumulate business know-how, transmit it as “organizational knowledge,” and create new knowledge in order to elevate corporate competitiveness.

Because putting this imperative into practice requires that organizational knowledge be managed appropriately as legally protected trade secrets, we offered education in this area, asking what constitutes trade secrets for each department and asking them to report on the status of trade secret management.

2nd term: Responding to antisocial forces such as gangs

There has been social pressure in recent years for companies to make a resolute response to antisocial forces such as gangs so that they have no relationship with them.

Takuma has expressed its policy of non-involvement with such groups in the Takuma Group Ethics Charter and Code of Conduct as well as in documents such as the Manual on Responding to Gangs and Other Antisocial Forces, and we offered education to spread awareness of this policy among employees.

4th term: Forward-looking CSR activities and the message from ISO 26000

We offered education on considering the company’s CSR activities of the future through the lens of ISO 26000, an international guidance standard on organizational social responsibility.

After the session, we held a discussion of which of 19 important issues identified by the CSR Division are particularly important for each department and why.

CSR lectures for corporate management

In February 2013, Satoru Fujimoto, General Manager of the Daikin Industries CSR & Global Environment Center, gave a lecture entitled “From Wave Rider to Wave Maker: Environmental Management at Daikin Industries” for Takuma’s management. Mr. Fujimoto talked about the relationship between environmental technology and corporate management at his company as well as how Daikin has implemented environmental management by integrating the two. A lively exchange of questions and views with the audience followed.



CSR Awareness Survey

As a means of understanding the levels of permeation and awareness of education that promotes compliance and CSR, and employing that data as reference for the integrated activities carried out during each fiscal year and for the following fiscal year’s action plan, we have conducted the “CSR Awareness Survey” every year since FY2008 with the end goal of utilizing that information for future compliance and CSR promotion activities.

The FY2012 survey was conducted by an out-

side organization to facilitate a comparison of Takuma (including some group companies) with other companies, particularly in the area of compliance.

Taken as a whole, the results indicate that Takuma’s efforts in this area compare favorably with those of other companies, indicating the effectiveness of its compliance and CSR promotion and education programs. Going forward, we will continue to conduct this survey and put the results to use in improving those programs.

Compliance Measures

Measures related to the Anti-Monopoly Law

Towards ensuring permanent compliance to the Anti-Monopoly Law, we enacted our “Regulations concerning Management of the Pledge of the Anti-Monopoly Act Compliance”, which provides for the submission of a written oath in regard to observing the Anti-Monopoly Law.

“Rules on Controlling Contact with Competitor’s Sales Departments, Etc.” defines the procedure for an employee to contact the sales department, etc., of a competitor and specifies that an application be made to and approval obtained from the affiliated division manager in advance to ensure fair business contact.

Legal Change Information System

In order to enable our employees to gain a continuous grasp of the latest information on revised and abolished laws and ordinances, we introduced our “Legal Change Information System”. In this system, the most recent information on revisions and changes to laws and ordinances is distributed by e-mail, and the details of the corresponding law or ordinance can be checked on the Internet.

Starting from FY2012, on top of the “Current laws and ordinances” menu, we added a searchable system on “Legal reports and descriptions of judicial precedents” to facilitate an even greater understanding of relevant laws and ordinances.

In-house Reporting System

We have been operating an in-house reporting system since August 2006, with the aim of promoting compliance management by uncovering illegal or unfair acts as early as possible and undertaking corrective measures.

Reporting contacts are set up at our Compliance & CSR Promotion Division and at an outside law office, as well as a dedicated contact for anonymous e-mail reporting. Our “In-house Reporting Code” and the “Takuma Group Code of Conduct” further declare that no informant shall be subjected to disadvantageous treatment simply due to his or her having filed a report.

In order for this system to be correctly understood and utilized, we distribute and publicize a card to all employees with information on the reporting contacts.



Material Procurement Policy

Takuma carries out procurement activity as defined by our Material Procurement Policy. We provide fair opportunities for all suppliers, irrespective of nationality, company size, or transaction history.

Suppliers are selected based on our comprehensive evaluation of their reliability and safeness in terms of quality, price, delivery, etc., as well as their abilities in technological development and supply capabilities.

Long-term stable transactions with dependable suppliers results in improved product reliability and greater corporate value. We, therefore, seek to establish relationships of mutual trust and mutual development with our suppliers.

While also respecting relevant laws and regulations as well as social norms, we strictly control and maintain any confidential information that we obtain through our business transactions.

Takuma procurement procedures and required items are posted on the following website.

Material Procurement Policy

1. Treat all candidates fairly when selecting a supplier.
2. Strive to discover new manufacturers.
3. Strictly control confidential information.
4. Strive to acquire new and pertinent information.
5. Promote green procurement.
6. Comply with laws and ordinances related to business dealings.
7. Always keep VA and VE in mind.
8. Strive for self-development.

[Takuma website > Material Procurement]  
<http://www.takuma.co.jp/procurement/index.html>  
(content in Japanese)

Activities Involving Product Quality

In 1997, we defined our Quality Policy of “Manufacturing products that result in customer satisfaction”, registered for “ISO 9001: Management Systems” certification (Registration No.: JQA 1952), and carried out concrete activities to enhance customer satisfaction as well as improve product quality based on our quality management system. The present status for ISO 9001 certification includes having switched to ISO 9001:2000 in FY2002 and then to ISO 9001:2008 in FY2010.

In order to produce products that customers truly appreciate, it is necessary not only to boost the quality of the product itself, but also to improve the content of that work as well as each individual’s ability to create a good product within each of the related processes (sales, design, procurement, manufacture, construction, and management).

Based on that Quality Policy, Takuma implements measures in each sales, design, procurement, manufacture, construction, and management process towards improving the quality of our products and services.

●Improving organizational operations

As measures for heightening the quality of the organization as a whole, we establish quality objectives in each section and department at the beginning of the fiscal year, and regularly report (twice per year) the status of achievements to the QM committee (quality management review).

●Internal quality audit

We raise the accuracy of each job through standardization of the work procedure within each process, confirm work status by implementing internal quality audits in each section and department, and enhance work content as necessary.

We invite lecturers from external organizations and hold training seminars for our internal audit members. In this way, we strive to have those personnel acquire knowledge ranging from fundamental knowledge about ISO 9001 to specific methods for implementing internal audits. Employees who attend lectures during this seminar and earn certification as internal audit members are required to periodically conduct internal audits of sections or departments with which they have no affiliation.

●Improving individual employees’ capabilities

Each section and department also creates a “Work (Technical Capability) Achievement Checksheet” in order to precisely grasp the work capability of the personnel required for each process. They then take measures towards further understanding and further honing each individual employee’s present abilities.

●Review of quality control and processes

Through such steps, quality control is recognized at Takuma, as well as everywhere else, as an important aspect of producing products.

In-house handling of non-compliant products involves implementing the measures (remedies) provided in the corresponding manual (standard). For processes in which there is even a possibility of non-compliance, review is carried out even on those products that were not initially deemed as being non-compliant.

In order to also prevent procurement of such noncompliant products, we provide further education (instruction) for all suppliers.



●Customer satisfaction survey

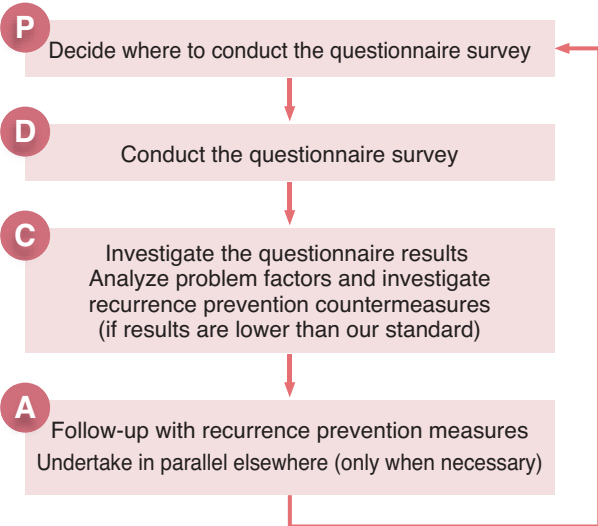
We use our customer satisfaction surveys to obtain feedback from customers when we have built new plants and delivered new equipment, for example, as well as from those to whom we provide regular servicing and upgrades for existing plants. These surveys allow us to hear the unvarnished opinions of our customers about the products that we have delivered and our staff who have been responsible for working with them.

We conduct our satisfaction questionnaire surveys for these types of customers and analyze the results. If there were problems, we analyze the factors that contribute to them and undertake countermeasures to prevent them in the future. The questionnaire survey process is shown on the right as a PDCA flow.

We have used this format to conduct questionnaires since FY2007. Since the second year, average scores of the evaluations we receive from the results have been continually over 80.

We specifically strive to increase the satisfaction of customers who give a total score of less than 70, or who select 1 (Dissatisfied) or 2 (Rather dissatisfied) on a 4-point scale to any of the evaluation items, by analyzing the problem factors in their questionnaire results and discussing measures to prevent recurrence.

For customers targeted for problem analysis and consideration of preventive measures based on the survey results, we also conduct a follow-up survey to discern whether those preventive measures were reliably implemented and whether their level of satisfaction has indeed improved (i.e., we ask the same customers to fill out the questionnaire again and check on whether or not there has been an improvement in their level of satisfaction).



PDCA cycle for customer satisfaction surveys

Average evaluation scores from questionnaire surveys

- FY2007: 73.4 points (37 plants)
- FY2008: 80.2 points (18 plants)
- FY2009: 83.5 points (26 plants)
- FY2010: 82.3 points (16 plants)
- FY2011: 85.5 points (18 plants)
- FY2012: 85.9 points (25 plants)





## Holding “Eco Classes”

In February 2013, Takuma held an “Eco Class” at an elementary school in Takasago.

In the program, which is conceived to increase residents’ awareness of and interest in environmental conservation, companies that have registered as supporters of the Takasago Eco Class program take advantage of their areas of expertise to visit schools in Takasago, where they teach classes.

It was Takuma’s first time to participate since registering as a member in 2009. Assistant manager Serizawa of the Technology Planning & Administration Department served as the teacher for Takuma’s Eco Class and spoke on the topic of “Thinking about Garbage” for 45 minutes and then engaged in a discussion with participants. Afterwards, a representative

of the city took the students for rides in an electric vehicle.

Takuma will continue its work as an Eco Class support member in the future as part of its community service and local cooperation activities.



## Disaster Preparedness Agreement Signed

Takuma has entered into an “Agreement on Use as a Temporary Evacuation Center in Case of Tsunamis, Etc.”, a Disaster Preparedness Agreement, with Amagasaki City.

Our corporate Head Office is located in Amagasaki where, based on lessons learned from the Great East Japan Earthquake, they are advancing the establishment of temporary evacuation areas in preparation for disasters, such as those that may be generated by tsunamis from earthquakes in the Tonankai and Nankai areas that are anticipated in the near future, as well as those from flooding caused by typhoons, heavy rain, and high tides.

To that end, we concluded a Disaster Preparedness Agreement with that city defining our Head Office as temporary evacuation center, and enabling the local populace free access whenever there is a possibility of one of the above disasters occurring. Our corporate Head Office is thus designated by Amagasaki City as a “Temporary Evacuation Center in Case of Tsunamis, Etc.” starting from October 2011.

We are pleased that Takuma can contribute to the community through this Agreement.

## Activities by Group Companies

### Iwate-Kenpoku Clean Co., Ltd.: Holding a business (environmental) briefing

Takuma Group company Iwate-Kenpoku Clean Co., Ltd. (IKC) held a business (environmental) briefing in December 2012. At the event, company officials met with local residents and business partners to report on the company’s business (environmental) activities during FY2011 and the status of ongoing operations in FY2012.

In addition to discussing developments in the processing of disaster waste and the status of the company’s acceptance of industrial waste from areas near the border with Iwate and Aomori Prefectures, the company reported on its performance in waste power generation and the status of efforts to reduce use of resources such as electricity, fuel, and water as well as energy consumption in order to lower its environmental impact. Officials also reported on the company’s participation in the Clean Kunohe Action Day for three consecutive years as part of

## Yotteko-mura, Arai

“Yotteko-mura, Arai” is launched in Takasago City’s Arai district with support from the Hyogo Prefecture’s “Kenmin Koryu Hiroba” (Civic Exchange Plaza) project. Takuma offers the “Takuma Club” recreation facility located in our Harima Factory free of charge as their village office. “Yotteko” means “come on over” in Banshu (southwestern part of Hyogo Prefecture) dialect and “Yotteko-mura” was inaugurated for the purpose of securing a new local community venue in which anyone can participate at any time.

Its daily activities include the opening of an area for playing the game of go, the lending of books, and various events are also held throughout the year. About 2,300 persons participated in the “Nagomi Market” held in commemoration of the 4<sup>th</sup> anniversary of the inauguration of Yotteko-mura in October 2012, and the event was packed with people.

Takuma will continue to contribute to the community through “Yotteko-mura, Arai”.

its program of environmental activities and training on preventing leaks of waste and chemical substances.

In addition to working to conduct its business in an environmentally friendly manner and actively disclosing information to ensure peace of mind on the part of local residents, IKC will strive to contribute to the local community.



## ● Supporting the World Food Programme

Takuma serves on the Board of Trustees of the Japan Association for the United Nations World Food Programme, which is an official support partner of the WFP (World Food Programme) in Japan. In support, we carry out a campaign period for about one month once per year and place posters around entrances to our office buildings and dining halls, etc., in order to get our employees thinking about the global food problem. We also undertake related fund-raising activities.

## ● Social contribution activities by Takuma employees ● Takuma Group coordinated cleanup activities

In line with World Environment Day on June 5, we organized a series of coordinated cleanup activities to clean the area around our offices from May to June 2012. The effort was the sixth of its kind. A call for volunteers from throughout the group resulted in the participation of 472 employees, which was more than took part the previous year. We will continue this activity in the future in order to make a contribution to local communities.



## ● Participation in the “Osaka Marathon ‘Cleanup’ Campaign”

As part of a tie up with “the city-wide campaign: ‘Clean Up Osaka’”, which is held every year in Osaka City, volunteers from Takuma’s Plant Service Department (Osaka) participated in the “Osaka Marathon ‘Cleanup’ Campaign” held in November 2012.



## ● Participation in GC-JN Collective Action for Recovery from the Great East Japan Earthquake

Volunteer activities to support areas stricken by the Great East Japan Earthquake have been carried out by GC-JN (Global Compact Network Japan) and member companies since September 2011. Makoto Wada from our Corporate Planning Department participated on behalf of Takuma in 2012. Activities included supporting the Watari Green Project in the town of Watari in Miyagi Prefecture, interacting with local residents, and holding workshops.

## ● Blood donation campaign

Takuma supports blood donation activities through the Japanese Red Cross Society. In our Head Office, 95 persons participated in this campaign in October 2012, 71 persons in March 2013, and at our Harima Factory, 15 persons participated in August 2012 and 12 persons in January 2013. We plan to continue this activity during FY2013 as well.

## ● Contributions to NPOs

### ● Purchasing UNICEF Christmas cards

Fifty percent of the proceeds are used to fund UNICEF in their work to help children around the world.

### ● Donating to a calendar market sponsored by the NPO “Nippon Volunteer Network Active in Disasters”

Takuma donated 150 unused in-house calendars. The proceeds are used to support disaster victims.

## ● Takuma Technical Review

We issue the Takuma Technical Review twice a year to introduce technologies being developed by Takuma. To date, we have published reports on plant operation, repair projects, demonstration testing, and new products. Abstracts are available at the Takuma website.



[Takuma website > Technical Information > Technical Review]

<http://www.takuma.co.jp/english/gijutu/gihou.html>

## ● Exhibitions

### ● Exhibiting at the 8<sup>th</sup> Eco-products International Fair

A large environmental exhibition was held in March 2013 in Singapore. Takuma manned a booth in the Ministry of the Environment’s Japan Pavilion, where the company introduced some of its technologies.



## ● Activities by group companies

### ● Iwate-Kenpoku Clean Co., Ltd.

Every year, the company welcomes local elementary school students on tours of its facilities. Pictures and diagrams created by employees provide an easy-to-understand explanation of how incinerators work for the students, who also tour the plant. Going forward, the company will continue to pursue activities that bring it closer to the local community.





**Satoru Fujimoto**  
General Manager,  
CSR & Global Environment Center,  
Daikin Industries, Ltd.

On CSR management

In recent years, the need for the creation of shared values (CSV) has been propounded as strategic CSR. In short, the idea is that companies should strive to create value that can be shared by both society and the company by simultaneously enhancing their competitiveness and resolving social issues. The Takuma Group is truly practicing strategic CSR with its management policy of maintaining “its role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection.” President and CEO Kato’s message expresses the company’s CSR management policy clearly. The company met its goal of restoring business performance under its 9<sup>th</sup> Mid-Term Management Plan, and now it is working to secure additional growth by building a sound business foundation under the 10<sup>th</sup> Mid-Term Management Plan. In this way, initiatives that integrate business and CSR comprise strategic CSR, and I expect them to fuel the company’s future development.

On “Businesses Development” and “Topics”

Strategic CSR requires companies to reform their business structures in response to the social demands of the times, and the Takuma Group has actively sought to do so. I believe that the group’s involvement in DBO projects as a way to create facilities that inspire local trust as well as projects to extend the service life of municipal solid waste processing facilities and efforts to strengthen its maintenance business are all business models that meet the requirements of our times. I also view the company’s strong commitment to biomass power generation as a source of renewable energy in the energy field as a favorable development. These are Japanese social issues, but at the same time, they are issues that also face emerging

nations, and I expect that Japanese technology and know-how can be leveraged to expand business operations overseas. Among the topics addressed in this report is Takuma’s contribution to recovery efforts in the aftermath of the Great East Japan Earthquake. I think Takuma has much to contribute as a leading company in waste processing, and I believe that the development of a system for removing radioactivity from incinerator fly ash is an important technology. Consequently, I hope to see the company continue to work hard in this area.

On the CSR Report

This CSR report provides an excellent account of Takuma’s CSR management strategy and overall CSR initiatives, and it provides valuable information for many stakeholders. In the future, I expect to see more data disclosed, including objective, quantitative information such as about targets and performance. For example, although the report discusses efforts to reduce total energy use, greenhouse gas emissions, waste and other emissions, and water use as environmental data, I suspect it could include more information about the company’s efforts and performance in this area, for example by specifying the targets for each year relative to the 2001 baseline and the environmental and CSR initiatives undertaken as a result. I’d also like to see the company disclose as much specific information as possible about targets and performance in metrics such as paid time off and workforce diversity in the areas of human rights and labor. I believe that by disclosing more information, Takuma can further improve its CSR.

Response to the Outside Expert Opinion



**Wataru Yoshida**  
Managing Executive Officer  
General Manager,  
Compliance & CSR Promotion Div.  
& Corporate Service Div.

I am deeply grateful to Satoru Fujimoto for offering an outside opinion on this report, which is the seventh CSR Report we have published. The principal focus of the report, FY2012, was the first year under Takuma’s 10<sup>th</sup> Mid-term Management Plan.

In describing his views, Mr. Fujimoto addressed the implementation of strategic CSR, business development, and information disclosure.

The Takuma Group is striving to provide new value in the fields of the environment and energy in order to resolve social issues such as global warming, which poses global-scale challenges, and to help achieve a recycling-based society. If we can increase (create) customer trust, social value, and corporate value through our businesses as a result of those efforts, there would be no greater joy. However, we believe that in order to do so, we must sincerely accept feedback from stakeholders and facilitate the organic development of our management resources. I look forward to focusing all of our resources on implementing the 10<sup>th</sup> Mid-term Management Plan while pursuing initiatives that integrate strategic CSR projects and overall CSR as described by Mr. Fujimoto and utilizing them as a driver of corporate sustainability.

Concerning Mr. Fujimoto’s suggestions about information disclosure, we will bring them to bear on future activities through the disclosure of objective information and quantitative data. We will establish new environmental targets, enrich our environmental reporting, and offer specific and transparent information about the processes by which we address important issues in our CSR activities.

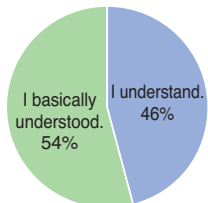
We look forward to accepting Mr. Fujimoto’s suggestions with sincerity as we compile future CSR Reports and pursue future CSR management while taking into account feedback from all stakeholders.

Takuma Corporate Profile & CSR Report 2012  
Questionnaire Survey Results

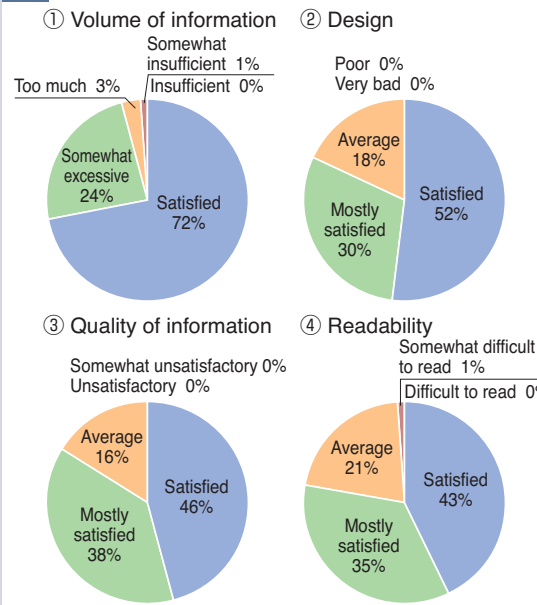
Survey period: June 2012 to May 2013  
Number of respondents: 800

Q1. Did you understand the activities of our company?

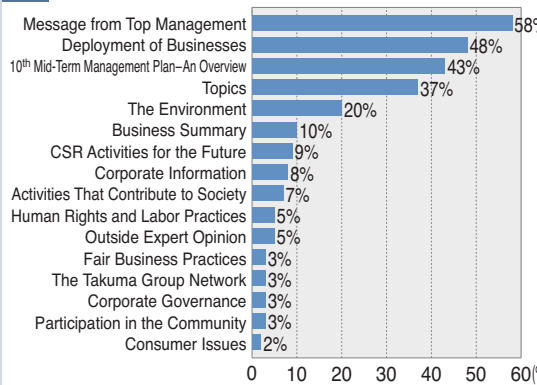
I couldn’t understand very well. 0%  
I couldn’t understand at all. 0%



Q2. What is your level of satisfaction regarding this Report?



Q3. Which items were you interested in? (Select up to 3.)



We thank everyone who has offered us their opinions, something that is useful to us in further improving this Report. We ask for your further cooperation in filling out this questionnaire regarding the FY2013 edition.





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