TAKUMA

CSR Report 2022

Serving the next 50 years of customers Creating the next 100 years of society

Takuma started out as a boiler manufacturing company that was founded in 1938 based on a philosophy of contributing to society through its technology. We have continued to offer support day in and day out to customers and communities by manufacturing essential facilities that will serve them for more than 50 years, including low-environmental-impact waste incineration facilities, biomass power plants, and clean centers that play a key role in their areas.

What will be required of us in the future?
We must create a sustainable society with a vision that stretches out to 100 years in the future, for example by going beyond conventional approaches to address climate change and realize a cyclical economy, by leveraging technologies and services to manufacture the essential facilities that will serve the next 50 years of customers as a leading company in the area of the environment and energy.

Serving the next 50 years of customers.
Creating the next 100 years of society.

That summarizes Takuma's corporate value, and our mission. We will continue to play an essential role for customers and society as a whole by creating essential products and services for the future while embracing a philosophy that has remained unchanged since the days of our founding.

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 “Serve society through boiler manufacturing*”, which in present-day language means “to contribute to society by supplying goods and services that we provide”. 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 Takuma and the Takuma Group companies are all based on the said founding spirit.

*Serve society through boiler manufacturing: It was the Company Motto of Takuma, then Takuma Boiler Manufacturing Co., Ltd., founded by Tsunekichi Takuma, one of the ten great inventors of Japan during the Meiji and Taisho periods (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 a 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 such 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.**

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Creating the next 100 years of society

Editorial Policy

The CSR Report 2022 is intended to communicate the Takuma Group’s efforts to realize sustained growth for itself and society to all stakeholders in an easy-to-understand manner by integrating financial information with non-financial information about topics such as Environment, Social, and Governance (ESG) initiatives in a comprehensive manner. This edition of the Report has been designed to provide an even better understanding by offering enhanced coverage of newly formulated corporate concepts and corporate governance information. We will use this report as a communications tool to deepen dialog with stakeholders, further improve CSR activities, and increase our corporate value.

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Coverage: This report applies to Takuma Co., Ltd., and its affiliates in principle. Time of issue: October 2022

We continue to help solve social problems and contribute to the sustained development of the world by creating valuable products and services.

October 2022
President and CEO, Takuma Co., Ltd.
Hiroaki Nanjo

■ Management Principles

Tsunekichi Takuma, one of the 10 greatest inventors of the Meiji and Taisho periods, founded Takuma in 1938 with the philosophy of “Serve society through boiler manufacturing”. Since that time the Takuma Group has inherited that philosophy and used it to establish businesses involving the full array of boilers while taking advantage of technologies developed through boilers to enter the environmental sanitation field with facilities such as waste treatment plants and water treatment plants, broadening its businesses with a focus on the fields of energy use and environmental protection, and contributing to society’s development and the resolution of social problems. P15-16

Takuma’s Management Principles state, “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”. Those Management Principles lie in this founding spirit, and a dedication to contributing to the sustained development of society over the long term through business activities remains the starting point of the Takuma Group as well as a core expression of its unchanging values.

Along with the technologies and expertise that the Takuma Group has accumulated through the repeated improvement of products and services in keeping with these values, the relationships of sincerity and trust that the Group has developed with longstanding customers by providing after-sales service and solutions have been passed down unbroken as the tangible and intangible assets that embody its greatest strengths and the source of its ability to compete successfully.

■ Towards sustained growth

Currently, we are facing a variety of social issues. Medium- and long-term trends posing global issues include the increasingly serious problems of climate change and rising energy demand accompanying population growth and economic growth in developing nations. Challenges in Japan include falling domestic demand due to the shrinking and aging of the population, labor shortages, financial pressure on both national and local governments, and aging of public infrastructure. Furthermore, impacts stemming from the COVID-19 pandemic and Russia’s invasion of Ukraine have added to the uncertainty surrounding humankind’s drive to realize a sustainable society. Against this backdrop, the question of how to achieve sustained growth into the future is a key challenge. The Takuma Group recently formulated Vision 2030, its long-term vision setting forth medium- and long-term management policies, and launched its 13th Medium-Term Management Plan (FY2021 to FY2023) in April 2021 as the first step towards realizing that vision. In addition to working to strengthen our existing businesses by reinforcing such aspects of our management foundation as human resources and engineering capabilities, we are striving to realize sustained growth by accelerating our response to future environmental changes. P27-30

Although we missed our initial target of ordinary profit of JPY 10.6 billion by a small amount during FY2021, the first year of the plan, we reliably turned continued robust demand for facilities like municipal solid waste treatment plants and biomass power plants into orders and exceeded the initial target for orders received by setting an all-time record for that metric. We will continue to work to implement the plan.

■ Implementing Environment, Social, and Governance (ESG) management

The Group is implementing ESG management, which seeks to satisfy all stakeholders and realize sustained growth for the Group by strengthening initiatives that address ESG issues through our business activities. P23-26

—Environment—

Vision 2030, which sets forth a long-term vision for the Group as it should exist in 2030, includes this statement: “Aim to maintain our role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection by realizing sustained growth alongside our customers and society through implementation of ESG management”. Reducing environmental impacts by increasing adoption of

renewable energy will be an essential part of steps to combat climate change. The generation of power using biomass and unutilized waste products as fuel will make a particularly significant contribution to the development of a Sound Material-Cycle Society by not only facilitating a stable supply of power independent of climate impacts, but also reusing and reducing waste. By converting biomass and waste into energy with the biomass power plants and municipal solid waste treatment plants we supply, we will help both reduce emissions of greenhouse gases like carbon dioxide and facilitate the long-term, stable supply of power.

—Social—

Human resources who contribute to each and every of our departments and worksites will play an essential role in realizing Takuma's sustained growth. By promoting diversity and utilizing a diverse workforce, we can respond to changes in the business environment in a flexible and timely manner. Furthermore, the deepening of the superficial promises diverse perspectives that will introduce new ways of thinking and ideas to our organization. By fostering mutual recognition and respect of diversity, the organization can accept diverse human resources, leverage their abilities, and create an environment in which employees are assigned to the positions that best suit them. Creating workplaces where each employee takes ownership by becoming an engaged and interested party, where colleagues collaborate closely and honestly share common purpose, and where everyone puts into action decisions made through thorough discussion will serve to strengthen growth and competitive capability.

—Governance—

At a time when the business environment in which the Group operates is forecast to experience continued uncertainty about the future, momentary lapses have the potential to turn into crises that shake management to its core. Under such conditions, Takuma's Management Principles provide a touchstone for reflection when grappling with difficult decisions. Fostering a perspective that asks whether we are valuing the Management Principles in our jobs and whether we are using them to inform decision-making will lead us in a direction that increases the organization's performance. By ensuring that the Management Principles permeate our organization, we can both resolve social issues and increase our profitability so as to realize sustained growth for society and the company alike.

■ Expectations for the new Harima Factory in 2022

The new Harima Factory will begin operating in December 2022. The new plant will inherit high-quality manufacturing policies to serve as a manufacturing facility characterized by higher productivity and quality as well as people- and environmental friendliness as it responds to an every-diversifying range of customer needs, including demand for larger boilers that operate at higher temperatures and pressures. We expect the new Harima Factory to accommodate a new era by inheriting the site's 80 years of history while combining new production technologies with tradition.

Takuma has been a signatory to the United Nations Global Compact* since 2006, and we support its 10 fundamental principles in the four areas of human rights, labor, environment, and anti-corruption. We will work to develop our business while understanding and respecting these globally shared principles. The Takuma Group has been helping resolve social issues with technologies for reducing emissions of greenhouse gases through such means as high-efficiency power generation using waste and biomass since before the phrase "renewable energy" entered into common usage. We believe that initiatives to achieve the Sustainable Development Goals (SDGs) put forth by the United Nations P14 and the COP21 Paris Agreement align extremely well with the Group's businesses.

Finally, in compiling this CSR Report we have sought not only to provide a resource by means of which a broad range of stakeholders can learn more about the Group's activities, but also to help each and every Group employee think carefully about CSR and bring that perspective to bear in his or her work. We at the Takuma Group encourage readers to offer their candid views and advice, which we will carefully review in order that we might better resolve social issues and contribute to the sustained development of society.

*United Nations Global Compact:
The Takuma Group has joined the United Nations Global Compact (UNGC), which is a voluntary effort to create a global framework for implementing sustainable growth by having companies and groups exercise responsible and creative leadership while acting as good members of society.

At a Glance

TAKUMA's strengths

●Established

1938

●Consolidated net sales (million JPY)

134,092

(Fiscal year ended March 2022)

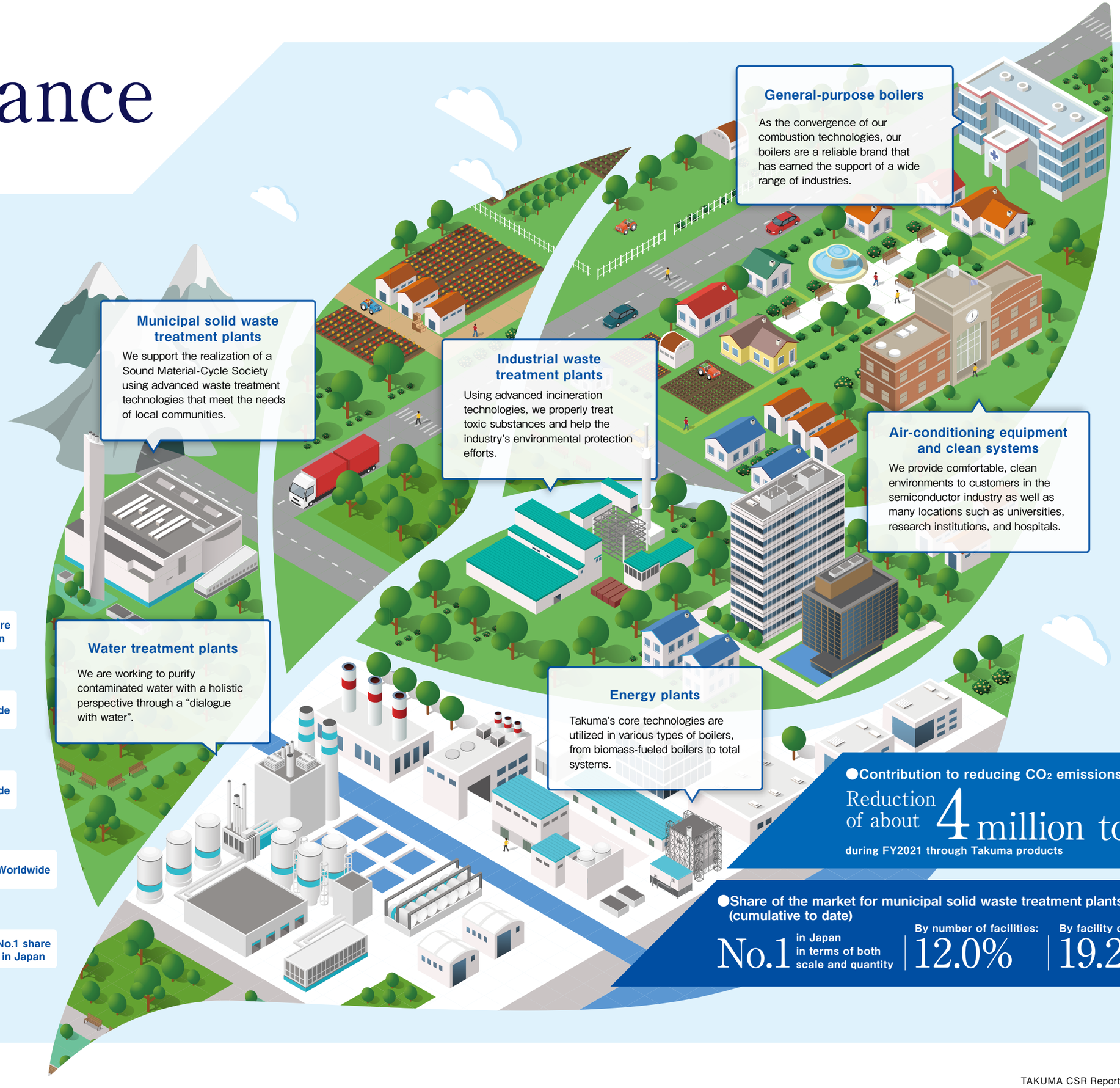
●Number of employees (consolidated)

4,145

(As of March 31, 2022)

●Our achievements (to date)

Municipal solid waste treatment	360+ (Japan) facilities	No.1 share in Japan
Biomass boilers	630+ units	Worldwide
Industrial waste treatment	120+ facilities	Worldwide
Boilers (including biomass)	3,200+ units	Worldwide
Upflow moving-bed sand filtration systems	2,700+ units	No.1 share in Japan



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●Contribution to reducing CO_2 emissions

Reduction of about **4** million tons

during FY2021 through Takuma products

●Share of the market for municipal solid waste treatment plants (cumulative to date)

No.1 in Japan in terms of both scale and quantity

By number of facilities: **12.0%**

By facility capacity: **19.2%**

TAKUMA's Technologies

From waste treatment to energy creation

Takuma's technologies that support infrastructure

Since inventing the first domestically produced boiler, Takuma has continued to contribute to the development of society by supporting social infrastructure.
Precisely because our businesses are related to the infrastructure upon which life and industry rest, the pursuit of technology is our core social mission.
Through our technological capabilities, we will contribute to the resolution of climate change and other social challenges by supplying plants that leverage proprietary combustion technology, waste treatment technology, water treatment technology, and other technologies developed since Takuma's founding.

Treating
waste

Creating
heat and electricity

Supplying
power to communities

Recycling
contaminated water

TAKUMA's Contributions

Serving as a leading company in the environmental field

Proven track record and accumulated trust: Leveraging Takuma's pride to realize a promising future

The track record and trust we have accumulated over more than 80 years testify to the essential role we play in the world, and we take pride in having helped resolve issues faced by customers and society throughout our history.
Rather than resting on those accomplishments, we will continue to embrace the challenge of realizing the sustainable development of society in these ever-changing times through the collective effort and hard work of our employees.

What can we do on behalf of the Earth? Protecting the environment and utilizing renewable energy.

We are harnessing a variety of technologies to help resolve these critical global environmental issues, which are set forth in the Sustainable Development Goals (SDGs) adopted by the United Nations. Helping ensure that people worldwide can enjoy affluent and fulfilling lifestyles while safeguarding our planet's abundant environment... we will continue to embrace these challenges.

TAKUMA's History

It all began with one man's pursuit of a challenge

Passing on the spirit of "Serve society through boiler manufacturing" to the future

Takuma was founded on the basis of the philosophy of "Serve society through boiler manufacturing". This philosophy reflects the thinking of founder Tsunekichi Takuma, and it has been passed down over the years to today's employees.

Company emblem at the time of Takuma's founding

The company emblem established at the time of Takuma's founding stylized the company's name (Takuma) with a triangular shape that combined the three core areas of its operations: research, manufacturing, and installation. The design expresses the company's philosophy which focuses on giving top priority to the continuous improvement of quality and on contributing to customers and society.

1938 Founding of Takuma Boiler Manufacturing Co., Ltd.

Founder Tsunekichi Takuma invented the first water tube type boiler to be entirely produced in Japan in 1912. The TAKUMA boiler offered performance that exceeded the imported products of the time, and its reputation spread. Takuma Boiler Manufacturing Co., Ltd., was established in 1938. The Company Motto of "Serve society through boiler manufacturing" was formulated, establishing the philosophy that went on to become the foundation of today's Management Principles.

Tsunekichi Takuma

1958 Entry into the environmental and sanitation markets

Takuma established itself as a manufacturer not only of boilers, but also environmental and sanitary equipment, for example by developing waste heat recovery boilers that use waste heat from manufacturing plants, developing modern technology for incinerating solid waste, and entering the water treatment market. In 1963, the company delivered Japan's first 24-hour operating waste incineration plant.

Japan's first 24-hour operating waste incineration plant (1963)

1972 Developing along with industrial society

Takuma worked to develop technologies to respond to various needs as Japan's economy grew rapidly, including demand for energy savings in industry, the growing volume and diversification of municipal waste, and improvements in water quality by water treatment systems. In 1972, Takuma Boiler Manufacturing Co., Ltd., which had grown beyond its principal business of boiler manufacturing, changed its name to today's Takuma Co., Ltd. The company transformed itself into an enterprise that operates a range of multifaceted businesses, including environmental equipment.

Name change (1972)

Mass production of the Vacotin Heater, the world's first vacuum-type hot water heater (1975)

1985 Building a resilient management foundation

Takuma continued to reform itself, formulating its first Medium-Term Management Plan in 1985 in order to accommodate abrupt changes in the economic environment. In 1992, the company introduced a new Company Motto of "Value Technology, Value People, Value the Earth", inheriting the spirit of the former motto of "Serve society through boiler manufacturing". Capping the track record and trust it had established to date, the company delivered one of the largest waste incineration plants in Japan in 1998. The facility continues to operate to this day.

Completion of the Amagasaki Head Office Building (1995)

Delivery of the Shin-Koto Incineration Plant (1998)

2001 Embracing global challenges and building a new era

Seeking to make further progress in the fields of renewable energy and environmental protection, Takuma supplied technologies for using energy from a variety of waste types and biomass as well as technology for rendering waste harmless. We established local subsidiaries overseas and continue to bring our technologies to customers not only in Japan, but also worldwide, particularly in Asia.

Delivery of an Energy from Waste plant in Europe (2010)

Construction of the Takuma Solar Power Plant (2013)

2022 Realizing a sustainable future

A contemporary society continues to change at a dizzying rate, we face complex problems such as climate change and changes in demographic structure. In FY2021, Takuma formulated Vision 2030, a long-term vision that calls on the company to practice ESG management, and the 13th Medium-Term Management Plan, and the company has now come together to work towards the goals set forth in those two documents. Going forward, we will continue to strive to increase our corporate value and realize a sustainable society.

Artist's conception of the new Harima Factory (tentative completion: December 2022)

TAKUMA's

WORK

Diversity in the service of innovation

Realizing a synergy of individual employees' diverse personalities and abilities is essential to Takuma's pursuit of ESG management.
We will draw on a culture that prizes friendly competition and hard work to make the most of the potential of our people so that we can pool employees' abilities to create new value for society and customers.

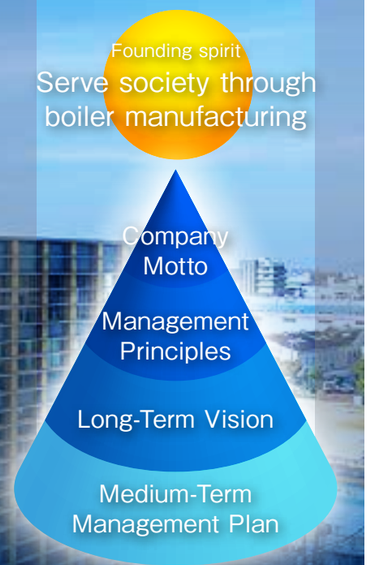
Section 01

Growth Strategies

The Takuma Group's Values and Vision

The Takuma Group's system of principles

The foundation of the Takuma Group is founder Tsunekichi Takuma's directive to "Serve society through boiler manufacturing" –in other words, to contribute to customers and society through the company's products and services. We have formulated our Company Motto and Management Principles based on that philosophy, and our management strategies rest on those principles.



Founding spirit (from 1938)

Serve society through boiler manufacturing

This philosophy served as the Company Motto of Takuma, then Takuma Boiler Manufacturing Co., Ltd., which was founded by Tsunekichi Takuma, one of the 10 great inventors of Japan during the Meiji and Taisho periods (1868-1926). The central tenet is to contribute to society through corporate activities such as the manufacture, sale, and service of boilers.

Our Founder Tsunekichi Takuma

Company Motto (from 1992)

Value Technology, Value People, Value the Earth

The previous Company Motto, "Serve society through boiler manufacturing", was replaced with the above in 1992, reflecting recognition that the company was operating a multifaceted business as a manufacturer of not only boilers, but also environmental sanitation systems like waste treatment facilities and water treatment equipment. It captures Takuma's stance of leveraging the personality and ability of each employee to refine technologies that consistently lead the industry and then using them to safeguard the Earth's environment.

Management Principles (from 2006)

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 Management Principles were crafted by organizing and articulating the value system embodied in the original Company Motto of "Serve society through boiler manufacturing".

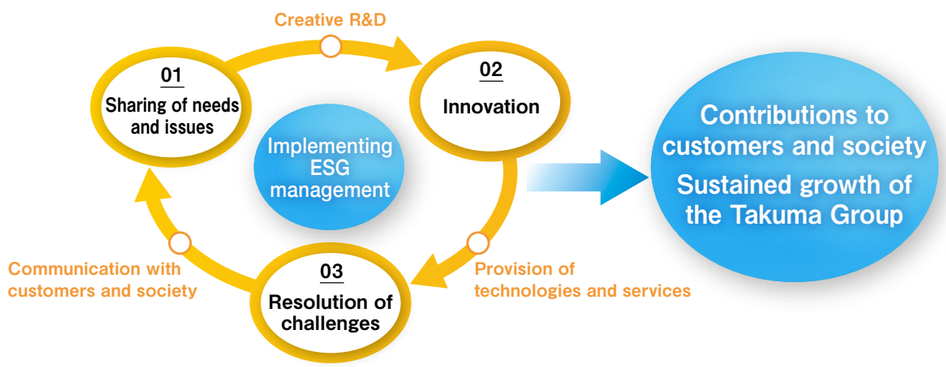
Our goal is to contribute to customers and society as a whole through the goods and services we create.

Vision 2030 (Long-Term Vision) (FY2021 to FY2030)

Future vision

Aim to maintain our role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection by realizing sustained growth alongside our customers and society through implementation of ESG management.

By formulating Vision 2030, our long-term vision looking towards 2030, we are seeking to realize sustained growth alongside customers and society.



Business portfolio

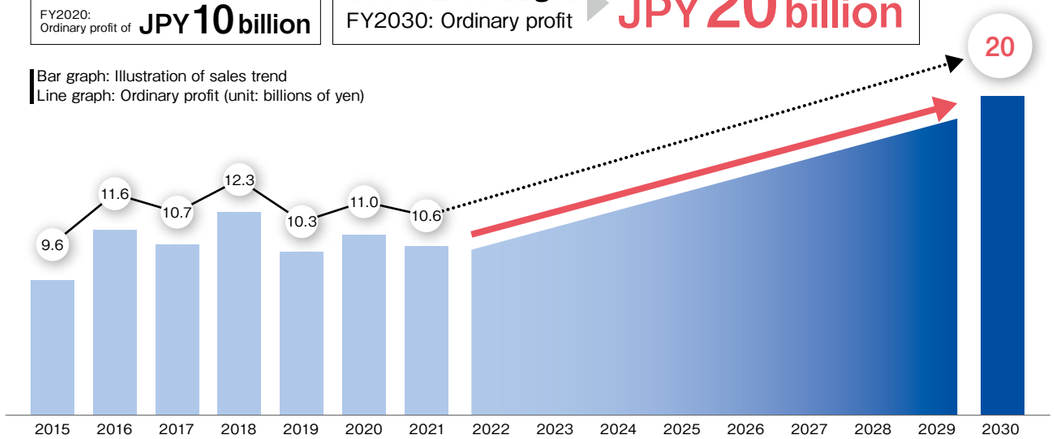
To realize our vision, we will grow while contributing to customers and society through the business described below.

EPC businesses	Recurring revenue model businesses	Overseas businesses
Domestic Environment and Energy Business	Domestic Environment and Energy Business	
Municipal Solid Waste Treatment Plant Business P32	Municipal Solid Waste Treatment Plant Business P32	Overseas Environment and Energy Business P36
Energy Plant Business P33	Energy Plant Business P33	
Water Treatment Plant Business P34	Water Treatment Plant Business P34	
	Power Retail Business P35	
Package Boiler businesses P37	**Equipment and Systems business P38**	**New businesses**

Financial target

Target under the previous corporate vision
FY2020: Ordinary profit of **JPY 10 billion**

Vision 2030 target
FY2030: Ordinary profit **JPY 20 billion**



Value Creation Process

We are working to create new value by strengthening initiatives that address Key Issues (Materiality) through businesses that tap the Group's strengths in light of medium- to long-term trends and social issues.

External environment

Global
- Rising demand for energy and waste treatment as the planet's population and economies grow
- Increasingly serious problem of climate change
- Progress of the Fourth Industrial Revolution and the digital transformation (DX)

Domestic (Japan)
- Shortages of human resources and future leaders caused by the shrinking and aging of Japan's population; depopulation around large cities and in rural areas
- Tight financial conditions caused by declining tax revenues in the face of the shrinking population and the need to deal with natural disasters and infectious disease
- Contraction and streamlining of public services due to tight financial conditions; increasing reliance on private-sector companies
- Demolition, consolidation, effective use, and replacement of aging and underutilized infrastructure, houses, etc.

Risks and opportunities

Opportunities
- Growth in demand for renewable energy, energy savings, and streamlining of initiatives to realize carbon neutrality by 2050
- Growth in demand for local production and local consumption of energy; rising expectations with regard to disaster-prevention facilities and energy centers
- Rising expectations with regard to effective use of unutilized resources and biomass
- Growth in demand for the streamlining of initiatives that take advantage of digital technologies
- Strengthening of competitiveness through human resources development and management that promotes diversity
- Improvement in productivity and strengthening of competitiveness through improvements in the workplace labor environment

Risks/Opportunities
- Changes in the environment, energy policy, and laws and regulations

Risks
- Reduction in domestic waste volume due to the shrinking of the population
- Shortages of employees with specialized skills
- Discontinuity in the passing down of skills as highly experienced employees leave the workforce
- Reduction in productivity and social trust due to problems involving safety and health
- Loss of opportunities for earning orders due to the occurrence of serious occupational accidents
- Reduction in business sustainability due to a lack of appropriate decision-making
- Cessation of business due to violations of competition or environmental law or regulations on conduct such as corruption, and associated reduction in social trust

Key Issues (Materiality) P25

1. Helping combat climate change
2. Conserving resources and protecting the environment
3. Strengthening relationships of trust with customers and communities
4. Pursuing partnerships and innovation
5. Promoting activities of human resources
6. Ensuring safety and health
7. Strengthening corporate governance

INPUT

Management Resources and Strengths

Relationships of trust with customers
- Proposals crafted from the customer's perspective
- Advanced plant design and construction capability founded on proprietary technology developed over many years of experience
- Fast, precise after-sales service to minimize the impacts of problems on customers' businesses and services

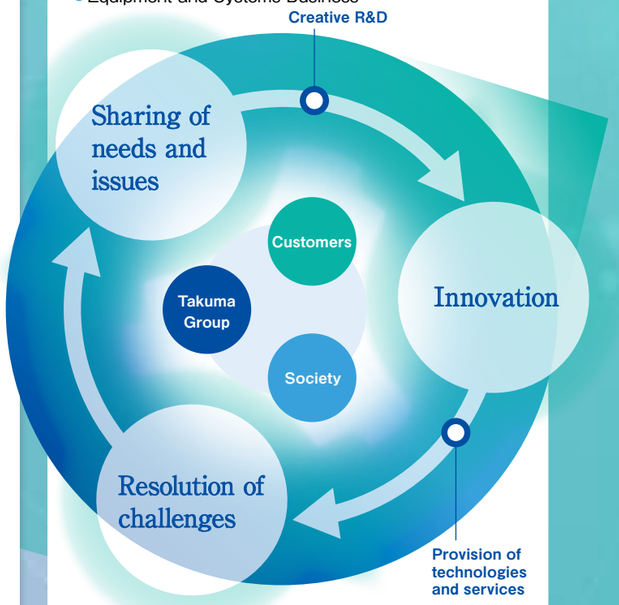
Technology and expertise
Engineering throughout the plant life cycle, from planning to construction and operation

Our achievements
- Boilers: About 3,200 units (of which, biomass boilers: about 630 units)
- Waste incineration plants: About 360 facilities
- Industrial waste treatment plants: About 120 facilities
- Sewage sludge incinerators: 20 facilities
- Sand filtration systems: More than 2,700 units

Human resources
Tough, dedicated human resources who will carry on Takuma's founding spirit and work closely with customers in the spirit of good faith

13th Medium-Term Management Plan P27

Business Strategies
- Domestic Environment and Energy Business
- Overseas Environment and Energy Business
- Package Boiler Business
- Equipment and Systems Business



Strengthening the management foundation
- Human resources
- Digital technologies
- Partnerships
- R&D; manufacturing and engineering capabilities
- Capital investment
- Compliance

OUTPUT

Provision of technologies (products) and services

We resolve Key Issues and accommodate customer needs through innovation.

- Municipal solid waste treatment plants
- Energy plants
- Water treatment plants
- Power retail business
- After-sales service for plants (operation management, maintenance)
- General-purpose boilers such as compact once-through boilers and vacuum-type hot water heaters
- Air-conditioning, water, and wastewater equipment installation services
- Equipment for use in the semiconductor manufacturing industry such as clean devices and cleaning systems

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FY2021 results

Net sales
JPY 134,092 million

Ordinary profit
JPY 10,647 million

Profit attributable to owners of parent
JPY 7,434 million

ROE
8.1%

Dividends
JPY 36 per share
(Fiscal year ended March 2022)

Realizing the Takuma Group's Management Principles and Vision 2030

Increasing corporate value while balancing contributions to society and sustained growth by implementing ESG management

Customers and regional society
- Protecting the living environment through the construction and operation of safe, secure municipal solid waste treatment plants
- Maintaining regional and industrial infrastructure through the highly efficient and stable supply of energy
- Revitalizing the regional economy and strengthening resilience through the construction and operation of facilities

Environment
- Creating clean energy
- Reducing greenhouse gas emissions
- Reducing environmental impacts

Created Value (OUTCOME)

Business partners
Building stable relationships of trust through fair and safe transactions

Employees
Realizing a workplace environment characterized by health, safety, high productivity, and high motivation

Shareholders
Increasing corporate value

Key Issues (Materiality)

In implementing ESG management, we have identified seven Key Issues (Materiality) related to ESG that deserve to be given priority when being addressed through our business activities during 2021.

We are practicing ESG management to address each Materiality while balancing contributions to customers and society and sustained growth by developing our businesses based on the Medium-Term Management Plan and providing necessary technologies and services.

Identification process

The following process was used to identify Key Issues.

Step 1
Analyzing the status quo and organizing issues

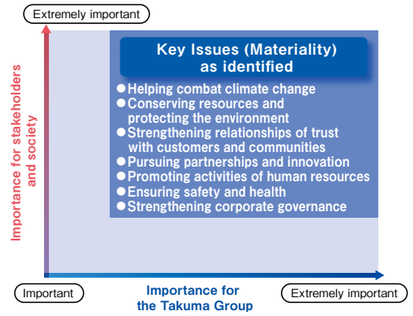
We analyzed a variety of management issues that affect the company from the dual perspectives of the external and internal environment.
We compiled a list of 64 issues by analyzing the external environment from the standpoint of ISO 26000, GRI, SDGs, FTSE, DJSI indicators and requirements, and the internal environment from the standpoint of indicators provided by the Group's Management Principles, strategies, current initiatives, and other yardsticks.

Step 2
Evaluating their importance and verifying suitability

We created a matrix organizing the 64 issues described to the left by analyzing and evaluating their importance for stakeholders and society on the vertical axis and their importance for Takuma on the horizontal axis. We then verified the suitability of the list through a process that included steps such as comparisons with other companies and exchanges of views with responsible departments to narrow down the list of Key Issues to 19 that deserved to be addressed by the Group.

Step 3
Identifying Key Issues

Through discussions among members of the company's executive leadership, seven Key Issues to be addressed by the Group were finalized based on the 19 issues as described to the right.



	Materiality and issues	Risks and opportunities	Specific initiatives	KPI	Progress (FY2021)
E Environmental Initiatives	**Helping combat climate change** 1. Promoting renewable energy (non-fossil energy) 2. Improving energy efficiency	**Risks** ●Accommodation of policies and regulations intended to realize a decarbonized society ●Changes in customer requirements, for example additional improvements in energy efficiency ●Reduction in support from policies, for example as a result of the review of the FIT program **Opportunities** ●Growth in the market for renewable energy and environmental businesses due to strengthening of environmental regulations ●Growth in energy usage demand for biomass (including waste, sewage sludge, and other resources) in order to alleviate climate change	●Supply of biomass power plants ●Supply of fuel conversion (biomass, RPF, etc.) boilers ●Supply of renewable energy and CO_2-free power ●Reduction in CO_2 emissions (energy consumption) by Takuma ●Improvement in energy efficiency at facilities Takuma operates on a contractual basis ●Proposal of energy efficiency improvements for customer facilities and equipment P47	**CO_2 emission reduction targets through our own products and services** **Magnitude of potential reduction in CO_2 emissions due to newly delivered power plants*** ・FY2023: 800,000 tons per year ・FY2030: 2.5 million tons per year *Biomass power plants and Energy from Waste plants delivered from FY2021 to FY2030 **Newly certified from FY2022** **In-house CO_2 emissions reduction targets** **・FY2023: Effectively zero CO_2 emissions by the Takuma Head Office and the Harima Factory (Scope 1 and Scope 2)** **・FY2030: Effectively zero CO_2 emissions by all Takuma worksites (Head Offices, branch offices, factories, and construction sites) (Scope 1 and Scope 2)** *FY2030 targets including group companies remain under consideration. *CO_2 emissions from procured products and use of Takuma products by customers (Scope 3) also remain under consideration.	**CO_2 emission reduction targets through our own products and services** **Magnitude of potential reduction in CO_2 emissions due to newly delivered power plants** **・FY2021: 30,000 tons per year*** *Calculated based on available generating capacity (renewable energy) as of one month after delivery for plants delivered in FY2021 (two waste treatment plants, one sewage sludge plant, and four biomass plants).
	Conserving resources and protecting the environment 1. Conserving resources and reducing environmental impacts 2. Making effective use of unutilized resources	**Risks** ●Reduction in domestic waste volume due to the shrinking of the population **Opportunities** ●Growth of appropriate treatment of waste and growth in demand for use of energy from waste in emerging nations ●Growth in expectations towards resource-saving and low-environmental-impact systems and the effective use of unutilized resources	●Supply of high-efficiency, low-environmental-impact Energy from Waste plants ●Supply of sewage sludge-fueled power plants ●Supply of advanced treatment sand filter systems ●Establishment of combustion technology for unutilized biomass ●Development of technology for reusing bottom ash ●Development of technology for recovering and using CO_2 P47		
S Social Initiatives	**Further strengthening relationships of trust with customers and communities** 1. Pursuing customer satisfaction 2. Ensuring the stable, continuous operation of plants and equipment 3. Recycling local resources and creating new value for communities	**Risks** ●Loss of trust in the event Takuma fails to provide safe, high-quality products and services ●Shrinking budgets of local governments **Opportunities** ●Growth in demand for biomass power generation as a type of energy that can be produced and consumed locally ●Growth in expectations toward the creation of new value for communities, for example through disaster prevention facilities and energy centers ●Additional growth in the use of private-sector entities to provide government services	●Supply of products and services that satisfy customers ●Improvements in the quality of Takuma's operation and O&M businesses ●Increasing sophistication of maintenance service ●Initiatives addressing the Regional Circular and Ecological Sphere (Regional CES), regional use, and decentralized power supplies ●Initiatives such as PPP that address additional use of private-sector entities P57	**Number of female employees brought into the main career track and management positions** 35 or more (Cumulative total for FY2021 to FY2025) **Percent utilization of parenting support programs** 25% or greater (Average for FY2021 to FY2025) **Number of fatal accidents** 0	**Number of female employees brought into the main career track and management positions** 10 **Percent utilization of parenting support programs** 32% **Number of fatal accidents** 1
	Pursuing partnerships and innovation 1. Utilizing digital technologies (AI, IoT, robots, etc.) 2. Developing open partnerships 3. Pursuing innovation	**Risks** ●Opportunity loss due to lag in accommodating new technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) **Opportunities** ●Growth in demand for efficiency-boosting and labor-saving technologies in plant operation (remote monitoring and operation, data analysis, maximization of amount of power sold, etc.) ●Creation of revolutionary technologies and services as well as new business opportunities through the expansion of partnerships	●Increases in the added value of facilities and plants ●Strengthening of competitiveness in EPC operations, operation management, and maintenance service ●Pursuit of open innovation ●Pursuit of new businesses that contribute to the enhancement of existing businesses and services ●Development of technologies and products that are sought by society and customers P59		
	Promoting activities of human resources 1. Securing and training human resources 2. Promoting diversity 3. Improving employee satisfaction	**Risks** ●Reduction in competitiveness due to a shortage of employees with specialized skills ●Discontinuity in the passing down of skills as highly experienced employees reach retirement age and leave the workforce **Opportunities** ●Strengthening of competitiveness through human resources development and management that promotes diversity	●Hiring of new graduates and mid-career employees ●Development of optimal human resources programs in response to social changes ●Development of an effective training system ●Active hiring of diverse human resources and development of career support programs P61		
	Ensuring safety and health 1. Ensuring occupational safety and health 2. Managing employee health 3. Creating a comfortable working environment	**Risks** ●Reduction in productivity and social trust due to problems involving the safety and health of employees and affiliates (loss of order opportunities due to the occurrence of serious occupational accidents, etc.) **Opportunities** ●Improvement in productivity and strengthening of competitiveness through improvements in the workplace labor environment	●Reduction in the occurrence of occupational accidents ●Prevention of health problems and rectification of overwork ●Implementation of workstyle reforms P63		
G Governance Initiatives	**Strengthening Corporate Governance** 1. Strengthening corporate governance 2. Strengthening risk management 3. Ensuring compliance	**Risks** ●Reduction in business sustainability due to a lack of appropriate decision-making ●Cessation of business due to violations of competition or environmental law or regulations on conduct such as corruption, and associated reduction in social trust **Opportunities** ●Improvement in the ability to create value along with avoidance and reduction of risk as a result of strengthened corporate governance	●Sustained improvement through practices such as evaluations of the effectiveness of the Board of Directors ●Continued conduct of appropriate internal audits ●Additional improvement in the effectiveness of risk management activities ●Even more thorough project risk management ●Implementation and ongoing reassessment of Business Continuity Planning (BCP) ●Ongoing implementation of compliance education P65	**Number of serious compliance violations** 0	**Number of serious compliance violations** 0

*For more information about the reasoning underlying our Materiality identification process, please see the Takuma website.

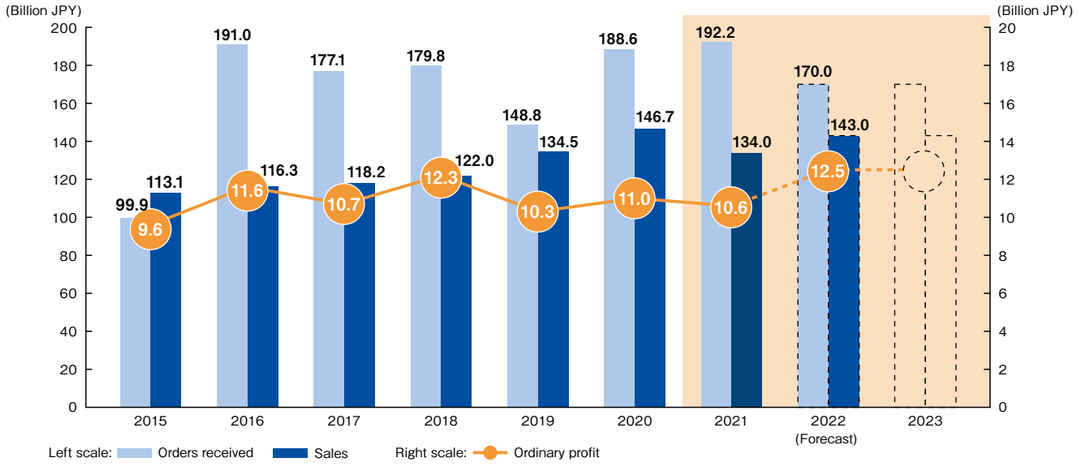
13th Medium-Term Management Plan

The 13th Medium-Term Management Plan began in FY2021 as an effort to realize the Vision 2030 goal of achieving ordinary profit of JPY 20 billion. The plan lays the foundations for further growth and takes the first steps towards realizing the plan's goals. Under it, we will strengthen conventional businesses by reinforcing the Group's management foundation and at the same time accelerate its response to future environmental changes. We will strive to realize sustainable growth alongside customers and society by implementing ESG management through our business activities.

Targets for the period covered by the 13th Medium-Term Management Plan

FY2021 to FY2023 **Total ordinary profit:** JPY **36** billion

FY2021 to FY2023 **Total orders received:** JPY **450** billion (reference)



Basic policy

Strengthening the management foundation P29•30

- Human resources
- Digital technologies
- R&D, manufacturing, and engineering capabilities
- Capital investment
- Partnerships
- Compliance

Pursuit of business activities that help resolve challenges faced by customers and society

1. Municipal Solid Waste Treatment Plant Business P32
2. Energy Plant Business P33
3. Water Treatment Plant Business P34
4. Power Retail Business P35
5. Overseas Businesses P36
6. New Businesses
7. Package Boiler Business P37
8. Equipment and Systems Business P38

Implementing ESG management

Progress towards implementing the 13th Medium-Term Management Plan

Kunio Hamada
Director &
Managing Executive Officer
Executive Manager of
Corporate Planning &
Administration Division

FY2021 results

During FY2021, the Takuma Group posted net sales of JPY 134 billion and ordinary profit of JPY 10.6 billion. Although both revenue and profit fell compared to the previous fiscal year, we set an all-time record for orders received thanks to robust demand, including replacement demand for municipal solid waste treatment plants. The order backlog is growing favorably since we are steadily booking orders for Design, Build, Operate (DBO) projects involving such plants.

Reflections on FY2021 initiatives

Reflecting the year's positioning as a time for laying the foundation for achieving Vision 2030, we hired more human resources than in a normal year and fostered their development in an effort to secure enough staffing, primarily in the Engineering, Procurement, and Construction (EPC) business and in recurring revenue model businesses, as we look to realize sustained growth. In addition to working to increase productivity through utilization of digital technologies, we are developing proposals for increasing added value by using AI in products and services. We are also updating our Harima Factory, which produces the boilers and combustion equipment that lie at the heart of the plants we manufacture, in order to transform it into a new plant capable of addressing issues like aging of equipment and the passing on of production technologies to a new generation of workers. The new plant is scheduled to be completed in December 2022.

In addition, the 13th Medium-Term Management Plan identifies a number of issues with which we must contend in order for the Group to realize sustained growth alongside society and our customers as Key Issues (Materiality). We are working to address those issues through our business activities. We are pursuing a variety of initiatives, including R&D targeting effective use of CO_2 and the development of programs and an environment in which female employees and other components of a diverse workforce can flourish professionally.

Prospects as we look towards 2030

We are steadily capturing demand in the current EPC business, and we are tapping recurring revenue model businesses such as after-sales service of delivered plants and the supply of power as drivers of growth. In addition to developing structures through the Medium-Term Management Plan so that we can consistently earn orders for Energy from Waste plants and biomass power plants, particularly in Southeast Asia, we will work to develop businesses that complement the direction in which society is moving, for example by commercializing decarbonization technologies, realizing a cyclical economy, and implementing the Regional Circular and Ecological Sphere (Regional CES). With the above initiatives, we will strive to realize our future vision as stated in Vision 2030—"aim to maintain our role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection by realizing sustained growth alongside our customers and society through implementation of ESG management"— and to achieve its target of ordinary profit of JPY 20 billion.

Hiroshi Oishi
Director & Executive Officer
Executive Manager of
Corporate Services Division

Strengthening the management foundation

We will work to strengthen the following six core areas of our management by allocating and investing management resources to steadily implement our business strategies.

Human resources

Theme 1 Strengthening recruiting activities and reviewing employment systems

- Systematically hiring new graduates and mid-career employees
- Reviewing programs to make use of older workers and to hire specialized workers

Theme 2 Reviewing the human resources development system

- Implementing career development support measures such as job rotation programs to help train engineers and other personnel, programs to follow up on the development of young workers, etc.

Theme 3 Pursuing workstyle reforms and enhancing the workplace environment

- Examining a diverse range of workstyles without regard to time or place
- Implementing health-focused management

Progress

We were able to significantly increase the number of people participating in recruiting information sessions by adopting a hybrid format that combines in-person and online components. Career hires also rose, particularly in the Construction Division and Engineering Division. Hiring of female employees is also rising gradually. Other initiatives included broadening the scope of short-time work for parenting and reviewing our telework program. P61・62

Digital technologies

Theme 1 Bringing digital technologies to products and services

- Rolling out digital technologies to reduce manpower requirements and streamline operations at plants, improve maintainability and functionality, and realize more stable operations

Theme 2 Improving management efficiency

- Implementing paperless workflows and Robotic Process Automation (RPA)
- Sharing knowledge and expertise on a companywide basis

Progress

In addition to developing and rolling out technologies that help improve added value, including use of AI in combustion control technology and technology for realizing staffing reductions through remote control from our Solution Lab (a remote monitoring and operational support facility), we reviewed business workflows and other operations and made progress computerizing them and utilizing Robotic Process Automation (RPA).

R&D, manufacturing, and engineering capabilities

Theme 1 Strengthening R&D

- Creating products and services required in this new era by utilizing open innovation

Theme 2 Strengthening manufacturing and engineering capabilities

- Refining and improving the quality of core technologies, the overall plant, and main equipment
- Increasing intrinsic safety in design and installation, and preventing occupational accidents

Progress

In addition to refining existing plant-related technologies and pursuing joint research and development into decarbonization technologies with other companies and universities, we worked to prevent occupational accidents, for example by making work equipment safer and offering VR-based hazards experience education.

Capital investment

Theme Pursuing plans for the new Harima Factory

- Developing a sustainable plan that aims to achieve effectively CO_2 emission-free operation
- Improving boiler manufacturing capabilities (quality and efficiency)
- Examining ways to utilize the Supply Lab

(Photograph of construction progress at the new Harima Factory) Date: June 16, 2022
Scheduled completion: December 2022 Capital investment: Approx. JPY 13 billion

Partnerships

Theme Creating new value through alliances

- Pursuing robust partnerships with non-group companies and other stakeholders in a variety of contexts

Compliance

Theme Increasing the effectiveness of compliance and risk management

- Improving and enhancing educational programs
- Continuing and improving risk management activities

Principal figures related to our effort to strengthen our management foundation as are follows: (Millions of yen)

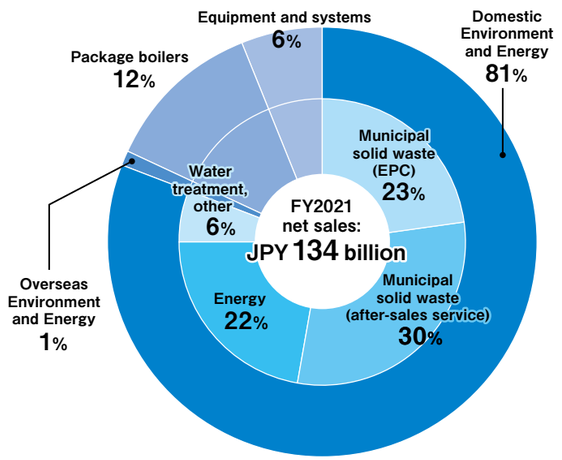
FY	2016	2017	2018	2019	2020	2021	2022 (Forecast)
Capital investment	342	505	638	1,564	2,420	3,844	9,000
R&D costs	972	928	960	1,154	1,047	1,006	1,600
Number of employees (consolidated)	3,447	3,609	3,619	3,816	3,925	4,145	–
Number of employees (non-consolidated)	824	837	852	875	894	958	–

Business Strategies

Business Composition

Takuma's business domain consists of four segments: Domestic and Overseas Environment and Energy Businesses, a Package Boiler Business, and an Equipment and Systems Business. The Domestic Environment and Energy Business accounts for about 80% of total net sales. Although the precise proportions vary with the nature of ongoing Engineering, Procurement, and Construction (EPC)* projects, the municipal solid waste treatment plant business generally accounts for about 60% of sales in the Domestic Environment and Energy Business, while the energy plant business accounts for about 30%, and the water treatment plant and other business, about 10%.

*EPC: A turnkey service extending from plant design to procurement and construction



Business Model (Domestic Environment and Energy)

EPC
About 2 to 5 years

Recurring revenue model businesses (after-sales service)
About 20 to 30 years

Engineering (E) → Procurement and production (P) → Construction and commissioning (C) → After-sales service

The plants Takuma delivers are called upon to operate in a stable and consistent manner for an extended period of time, generally 20 to 30 years, as key infrastructure that not only supports treatment of local waste, but also supplies power and heat. After spending several years constructing each plant, we build relationships of trust by supporting customers' government services and business activities through continuous after-sales service over the course of the next two or three decades. By putting the technologies and expertise we have accumulated through such operations to use in EPC and after-sales service, we operate our businesses while further enhancing our strengths.

Domestic Environment and Energy Business

Municipal Solid Waste Treatment Plant Business

1 Business overview and strengths

We provide solutions that extend throughout the plant life cycle, from construction (EPC) of municipal solid waste treatment plants for local governments to maintenance, primary equipment improvement and service life extension, operation management, and O&M*.

Since delivering Japan's first domestic 24-hour operating waste incineration plant in 1963, Takuma has delivered more than 360 waste incineration plants, the most of any domestic manufacturer. In addition to supplying products and services that meet regional needs based on the technology and expertise that we have accumulated through a long series of improvements across more than half a century, we have been working to further increase the value we provide by incorporating leading-edge technologies like Artificial Intelligence (AI) and the Internet of Things (IoT).

Principle products

- Waste incineration plants, biogas recovery plants, recycling plants, etc.

*O&M: Operation & Maintenance

2 Market environment

Of Japan's approximately 1,000 operational waste incineration plants, which together have a daily treatment capacity of about 170,000 tons, about 60% have been operating for at least 20 years, highlighting the extent to which equipment aging is a serious issue as well as the resulting outlook for replacement and service life extension demand in the near term.

Use of the O&M business, which comprises a comprehensive contract for facility operation management and maintenance, and DBO arrangements, which comprise orders for both facility construction and O&M, is growing from the standpoint of taking advantage of private-sector expertise. At the same time, facilities are expected to provide functionality that creates new value for their region, for example by serving as regional disaster prevention facilities or energy centers, rather than simply treating waste.

Moreover, as society works to realize carbon neutrality by 2050, demand for Carbon dioxide Capture, Utilization and Storage (CCUS) is expected to grow in the medium and long-term, augmenting a trend that is also supported by adoption of increasingly advanced use of power and heat from waste and combined systems that pair incineration with technologies like methane fermentation.

3 Initiatives

We work continually to capture orders by offering proposals that meet a diversifying range of customer and community needs, and during FY2021 we earned orders for three DBO projects. In addition to launching long-term operation (on the order of 10 to 20 years) projects at five new sites, including DBO projects, we are leveraging new orders to steadily expand our recurring revenue model businesses by crafting proposals for optimal solutions that meet individual customers' needs.

We are also moving forward with initiatives to reduce power and labor in plant operation by utilizing digital technologies, for example by developing the Intelligent Control System (ICS), an AI combustion control system, and through remote operation and monitoring via our Solution Lab, a remote monitoring and operational support facility. In addition, we are pursuing initiatives to help realize a decarbonized society in partnership with a variety of corporate and organizational partners, including by developing technologies for isolating, recovering, and effectively utilizing CO_2 emitted by plants and by participating in the Carbon to X (C2X) project.

Energy Plant Business

1 Business overview and strengths

In addition to construction (EPC) and maintenance of energy plants for private-sector operators, we offer O&M and other services.

Since its founding in 1938, Takuma has delivered more than 3,200 boilers, both in Japan and abroad. Drawing on proprietary combustion technologies and heat recovery technologies that we have improved and evolved together with customers over the course of that long history, we are helping customers and society helping customers and society reduce and eliminate carbon dependency by supplying plants that recover energy from a variety of biomass resources and non-fossil fuels, including wood, poultry manure, and RPF.

Principle products

- Biomass power and heat utilization plants, RPF power and heat-use plants, industrial waste treatment plants, etc.

2 Market environment

Since the introduction of the Feed-in Tariff (FIT) program, which locks in purchase prices for renewable energy, demand for biomass power plants has grown rapidly, and we have delivered more than 40 biomass power and heat utilization plants, including facilities that are not eligible for the FIT program, since 2014, when we augmented our long experience in biomass boilers by delivering our first FIT-eligible unit. Today, changes to the FIT program and other factors are driving a shift in demand to small and medium-size biomass power and heat utilization plants to supply power for local use and to serve as locally produced, locally consumed energy sources.

Additionally, many industrial boilers that use fossil fuels such as coal and heavy fuel oil, which are common in factory applications, are due to be updated, and we expect that the level of need for conversions to non-fossil fuels such as biomass and RPF will grow as society works to reduce and eliminate dependence on carbon.

3 Initiatives

We are working to steadily capture orders for biomass power plants, especially the small and medium-size facilities that represent a key Takuma strength (with power output on the order of 2 to 10 MW), and during FY2021 we earned orders for six new biomass power plants. In addition to securing an order for our third long-term O&M project for a private-sector entity, we offered proposals for solutions targeting the ever-growing number of plants we have delivered, including precisely targeted maintenance service, energy savings, power output enhancements, improvements in equipment functionality, and service life extensions. In this way, we are helping customers both resolve issues and reduce carbon dependency while steadily growing our recurring revenue model businesses.

We launched a CCUS technology study using a biomass power plant currently under construction as a model, and we are actively moving forward with studies and research geared towards future decarbonization and resource and environmental conservation, for example through effective use of biomass combustion ash.

We will continue to contribute to increased adoption of renewable energy and efforts to reduce and eliminate carbon dependency in customers' business activities through increased deployment of power and heat utilization plants that use biomass and non-fossil fuels in response to plans and proposals that precisely assess customers' issues and needs.

Water Treatment Plant Business

1 Business overview and strengths

In addition to construction (EPC) and maintenance of water treatment and sludge treatment plants, particularly for sewage treatment plants run by local governments, we supply operation management and other services.

Since entering the water treatment field in 1962, we have accumulated technology and expertise by supplying water treatment plants and sludge treatment plants in a variety of fields, including sewage, human waste, and industrial wastewater. In recent years, we have been particularly focused on the sewage treatment field, and we are helping resolve customers' issues with unique technologies like an energy-saving and energy-creating sludge-fueled power system featuring low emissions of the greenhouse gas N_2O and moving-bed sand filtration systems (Uniflow Sand Filter), of which we have delivered about 2,700 units since 1979.

Principle products

- Sewage sludge-fueled power plants, moving-bed sand filtration systems (Uniflow Sand Filter), etc.

2 Market environment

There are some 2,200 sewage treatment plants in Japan, and those facilities are aging, with more than 80% having been operating for at least 15 years.

As we work to realize a decarbonized society, demand for the ability to reduce emissions of greenhouse gases from sewage treatment and to utilize sewage sludge, a type of biomass, as renewable energy is growing.

At the same time, utilization of private-sector structures such as Public Private Partnerships (PPPs) and Private Finance Initiatives (PFIs) is expected to continue to grow due to the challenging business environment in which local governments' sewage services operate.

3 Initiatives

We have been offering customers equipment update proposals that take advantage of the features of the high-speed sand filtration systems we have developed, and during FY2021 we secured multiple orders in this product area, including a large project for the Bureau of Sewerage Tokyo Metropolitan Government (Ochiai Water Reclamation Center). These systems, which deliver two to three times the filtration capacity of past designs, feature a compact, space-saving design, making it possible to reduce the number of basins that must be installed as well as the time required for construction compared to the alternative of replacing existing fixed-bed sand filtration systems.

In addition, a generator-equipped sewage sludge incineration plant that we built (Sapporo City Seibu Sludge Treatment Center) ("New System 1"), our second such project, began operating in August 2021. With power output of 200 kW, the generation system is making a significant contribution to reducing greenhouse gas emissions, for example by providing about 80% of the plant's power needs. We will continue to help reduce greenhouse gas emissions in sewage treatment by working continually to secure orders.

Power Retail Business

1 Business overview and strengths

Group company Takuma Energy Co., Ltd., operates a power retail business using primarily power generated by municipal solid waste treatment plants and biomass power plants delivered by Takuma.

The company was established in August 2015 to offer services that increase the added value of plants delivered by Takuma through the procurement and supply of power. Takuma Energy is taking advantage of its relationships with customers and group companies to contribute to the adoption of regional renewable energy, for example by operating a local power production/consumption business by supplying power generated at municipal solid waste treatment plants and biomass power plants to public facilities and other sites in the surrounding community, a service that it currently offers in seven communities.

2 Market environment

Demand for decentralized energy and local production and consumption of power is rising from the standpoint of considerations such as ensuring a supply of energy in times of emergency, efficiently utilizing energy, and revitalizing local communities. Against that backdrop, we expect the importance of power and energy services in the Group's business domains to grow in the future, for example in development of the Regional Circular and Ecological Sphere (Regional CES) for waste treatment and regionally utilized power supplies in the FIT program.

Additionally, the level of need for renewable energy and CO_2-free power that have environmental value is growing from the perspective of reducing and eliminating dependence on carbon in business activities. The market is expected to grow further as society works to realize carbon neutrality by 2050.

3 Initiatives

In addition to starting to supply power to public facilities and other sites in the cities of Imabari, Ehime Prefecture, and Machida, Tokyo, as part of our local power production/consumption business, we have started supplying locally produced, CO_2-free power to contribute to decarbonization in the village of Kunohe, Iwate Prefecture, with which we have entered into an agreement, in partnership with Iwate-Kenpoku Clean Co., Ltd., a group company based in the village that operates a waste treatment business. (Service in all three locations was launched in April 2022.)

We also began supplying 100% effectively renewable energy to the Head Office and Harima Factory in April 2022. Thanks to this initiative, we expect to reduce CO_2 emissions at Takuma's Head Office, branches, and factory by about 80%.

In addition to continuing to contribute to measures to address climate change through the supply of renewable energy-derived, CO_2-free power, we will help resolve regional issues, for example by proposing local power production and consumption schemes that have been custom-tailored for specific communities.

Overseas Environment and Energy Business

Overseas Businesses

1 Business overview and strengths

We supply construction and maintenance services for biomass power plants and Energy from Waste plants with a focus on Thailand and Taiwan, where we have local subsidiaries.

Since delivering a bagasse fired boiler (bagasse: the residual material left after pressing sugarcane) to a customer in Taiwan in 1949, we have delivered more than 380 biomass boilers to overseas customers, primarily in Southeast Asia. We have also delivered about 120 boilers, primarily to sugar refineries in Thailand making a significant contribution to the development of the country's sugar industry.

We have also delivered a total of 16 waste treatment plants to customers in Taiwan, China, South Korea, and the UK since delivering our first such plant overseas in the U.S. in 1986.

Principle products

- Biomass power plants, Energy from Waste plants

2 Market environment

Although a certain level of demand is expected to continue for bagasse-fueled biomass power plants, the business environment remains characterized by intense competition with Indian and Chinese manufacturers. At the same time, the Thai government has announced a policy of promoting biomass power generation, and demand, including for biomass other than bagasse, is expected to grow.

On the other hand, Energy from Waste projects in the emerging nations of Southeast Asia are often derailed for reasons such as a lack of programs and standards related to waste treatment and insufficient government funding, and a stable market has not yet developed. Nevertheless, the level of need for waste-fueled power generation is rising significantly due to population growth and urbanization, and we expect the sector to remain a growth market over the medium- and long-term.

3 Initiatives

Despite a tough environment in FY2021 whose challenges included the pandemic, which greatly limited sales activities, as well as delays in plans and other adverse developments, we earned an order for an equipment replacement project at an Energy from Waste plant in Taiwan. Demand for facility replacement and service life extension work is rising in the country as Energy from Waste plants built from the second half of the 1980s to 2000s age. We will continue to put in place structures to help us secure orders, including through partnerships with local companies, as we look to tap future demand, particularly in Thailand and Taiwan.

In addition to working to further lower costs for biomass power plants, for example by enlarging the scope of overseas procurement, we will strive to capture orders on an ongoing basis by increasing added value to differentiate our products and services from competitors, including by enhancing maintenance service through our subsidiary in Thailand.

Package Boiler Business

Package Boiler Business

1 Business overview and strengths

Group company Nippon Thermoener Co., Ltd., manufactures, sells, and maintains general-purpose boilers in addition to designing and building related heat source equipment and systems for various types of manufacturing plants as well as hotels, hospitals, commercial buildings, and other facilities.

Over the many years since its establishment in 1961, Nippon Thermoener Co., Ltd., has supported consumer lifestyles as well as industry by accumulating extensive experience in an array of package boilers, which are used in a variety of industries and applications. In an effort to accommodate the changing times and environment as a manufacturer specializing in heat source equipment, the company meets a diverse range of customer needs by developing new heat source systems such as hybrid hot water systems based on the technological capabilities and expertise it has accumulated over its long history.

Principle products

- Once-through boilers (Equos), vacuum-type hot water heaters (Vacotin Heater), heat-transfer oil boilers (Thermoheater), smoke tube boilers (RE Boiler), hybrid hot-water systems, etc.

2 Market environment

Although the domestic general-purpose boiler market has matured and will shrink over the medium- and long-term, we expect demand for equipment replacement and related services to continue in the near term due to the large size of the installed base. Additionally, demand for energy-saving boilers is expected to increase overseas, particularly in emerging nations. We expect efforts to gain additional energy savings and efficiency gains from boilers as part of the larger drive to reduce and eliminate carbon dependency to accelerate and the market to shift to heat-source systems that use non-fossil fuels over the long-term.

3 Initiatives

While demand, which had fallen due to the COVID-19 pandemic, has shown signs of a partial recovery, the market remained challenging during FY2021 as a full-throated recovery failed to materialize. Nonetheless, we worked to maintain the scale of orders, for example by proposing optimal systems, and initiatives to open up new markets for heat-source equipment made some progress as we continued to earn orders for wood chip-fueled biomass boilers.

Going forward, we will work to maintain and increase the scale of orders earned in the domestic market by continuing to provide a diverse line of products and by proposing systems that have been optimized to meet customers' needs. In addition to supporting both consumer lifestyles and industry by working to enlarge our overseas business, particularly in Southeast Asia, where our Thai subsidiary operates, we will contribute to reducing greenhouse gas emissions through adoption of high-efficiency, energy-saving systems.

Moreover, we will strive to pioneer new markets based on our vision for a decarbonized society by supplying highly efficient systems that yield greater energy savings, for example hybrid hot-water systems that pair a heat pump with a vacuum-type hot water heater, and new heat-source systems that utilize non-fossil fuels, for example wood chip-fueled biomass boilers.

Equipment and Systems Business

Equipment and Systems Business

1 Business overview and strengths

Group company Sunplant Co., Ltd., designs and installs a range of building equipment, including air-conditioning, water, wastewater, and hygienic, and firefighting systems, while group company Dan-Takuma Technologies Inc. supplies clean system-related equipment and devices that provide a suitable environment for prime manufacturing systems for the semiconductor and electronic device manufacturing industry.

Sunplant, which operates a building equipment business, was established as a boiler installation company in 1941. After entering the equipment construction business in 1965, the company began offering a variety of building equipment for use in education and research facilities, healthcare and social welfare facilities, commercial and cultural facilities, plants, railroad facilities, and other sites. In this way, it has supplied optimal environment that are custom-made to suit a variety of applications and requirements based on the technology and expertise it has accumulated over many years.

Since its establishment in 1969, Dan-Takuma, which supplies equipment to the state-of-the-art semiconductor industry, continues to make a steady contribution to the development of that industry based on more than half a century of experience in the semiconductor and electronic device industry and a high level of trust built on its ability to solve issues from the customer's perspective.

Principal products and services

- Building equipment installation, chemical filters, magnetically shielded chamber equipment, semiconductor material washing systems, AMC analysis and monitoring systems, etc.

2 Market environment

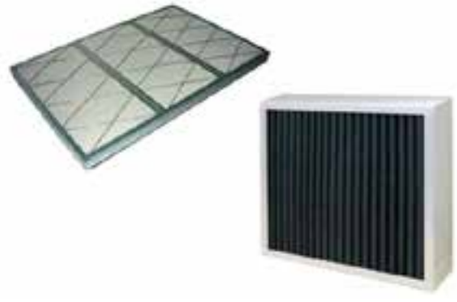
Although construction demand has been affected by a temporary drop-off in private-sector investment due to the effects of the pandemic, we expect robust demand to continue over the medium and long term as orders for healthcare and social welfare facilities augment equipment replacement and improvement work at aging public facilities.

Amidst rapid growth recently in demand for semiconductors in various industries, a global shortage has emerged as a social phenomena, with industry observers pointing to an inability to obtain semiconductors used in semiconductor manufacturing equipment. From a long-term perspective, the sector is expected to grow thanks to large-scale investment accompanying a global supply chain decoupling in semiconductor manufacturing driven by national security issues of various countries and demand for infrastructure maintenance and improvements.

3 Initiatives

In the building equipment business, we will work to further strengthen our sales and installation capabilities by securing and training human resources, and we will strive to achieve steady growth in the scale of orders received by creating optimal environments that are custom-made to suit a variety of applications and requirements.

Drawing on favorable business performance that has gained momentum thanks to the recent market environment in the semiconductor and electronic device manufacturing equipment field, we will work to expand our business on an ongoing manner through additional, stable contributions to customers and related industries as we build products and enlarge business opportunities by implementing measures under our Medium-Term Management Plan.



Main Recent Projects

This section introduces major projects delivered by Takuma during FY2021 in the Domestic Environment and Energy Business.

Municipal solid waste treatment plants

New Construction

Machida City Bio-energy Center

Project name: Machida City Heat Recovery Facility (tentative name) Development and Operation Project

Location: Tokyo

Capacity:
Waste incineration facility:
258 tons per day
(129 tons per day × 2 units)

Biogas recovery facility:
50 tons per day
(25 tons per day × 2 units)

Unburnable/bulk waste processing facility:
47 tons per 5 hours

Power output:
6,220 kW (waste incineration facility)
750 kW (biogas recovery facility)

New Construction

Ariake Himawari Center

Project name: Waste Incineration Facility Construction Project

Location: Fukuoka Prefecture

Capacity: 92 tons per day (46 tons per day × 2 units)
Power output: 1,810 kW

Primary Equipment Improvements

Clean Center Tonami

Project name: Clean Center Tonami Primary Equipment Improvement Project

Location: Toyama Prefecture

Capacity: 90 tons per day (45 tons per hour × 2 units)

Energy plants

Satsuma-cho Biomass Power Generation LLC

Project name: Wood Biomass Power Generation Plant Design, Procurement, and Commissioning Project

Location: Kagoshima Prefecture

Capacity: Fuel: Wood fuel
Steam conditions (regular operation):
11.1 tons per hour × 4.2 MPaG × 405 ℃
Power output: 1,990 kW

Meiken Lamwood Corp.

Project name: Wood Biomass Power Generation Plant Installation Project

Location: Okayama Prefecture

Capacity: Fuel: Wood fuel
Steam conditions (regular operation):
27.7 tons per hour × 6.0 MPaG × 425 ℃
Power output: 4,990 kW

Rikyuu Co., Ltd.

Project name: Wood Biomass Power Generation Plant Design, Procurement, and Commissioning Project

Location: Kanagawa Prefecture

Capacity: Fuel: Wood fuel
Steam conditions (regular operation):
11.1 tons per hour × 4.2 MPaG × 405 ℃
Power output: 1,990 kW

Kyushu Renewable Energy Co., Ltd.

Project name: Kikuchi Biomass Power Plant Construction Project

Location: Kumamoto Prefecture

Capacity: Fuel: Wood fuel
Steam conditions (regular operation):
29.2 tons per hour × 6.0 MPaG × 425 ℃
Power output: 6,250 kW

Water treatment plants

Sapporo City Seibu Sludge Treatment Center

Project name: Sapporo City Seibu Sludge Treatment Center (Disaster Prevention and Safety Grant Program) "New System 1" Incineration Facility Incineration Machinery and Equipment Installation Project

Location: Hokkaido

Capacity: Stoker furnace
Facility scale: 100 tons per day × 1 unit
(Power output: approximately 200 kW)

Oita City Public Sewage Benten Water Resources Recycling Center

Project name: Oita City Public Sewage Benten Water Resources Recycling Center Amenity External Machinery and Equipment Renovation Project

Location: Oita Prefecture

Capacity: Treatment capacity: 6,900 ㎥ per day
Type: High-speed moving-bed continuous sand filter
Specifications: M20 × 4 units × 3 basins

Feature

Realizing a New Type of Sound Material-Cycle Facility

Machida City Bio-energy Center

A bio-energy center that processes municipal waste together with a biogas recovery facility— the first in the Tokyo metropolitan area and a leading facility for the world

The City of Machida, the owner of this facility, has worked to reduce waste volume in keeping with its core philosophy of avoiding the generation, incineration, and landfill of waste in order to safeguard the local and global environment. The Machida City Bio-energy Center, which was delivered by Takuma, breathes new life into its predecessor facility, the Machida Recycling Cultural Center, which previously handled waste treatment in the city, as a more environmentally friendly facility.

What is biogas?

Biogas is a gas that is created by using the power of microorganisms to ferment waste and other materials. It contains methane, a readily combustible gas, that can be used as a source of energy by gas power plants. Biogas promises to help reduce carbon dioxide emissions by enabling waste to be used effectively.

Facility overview

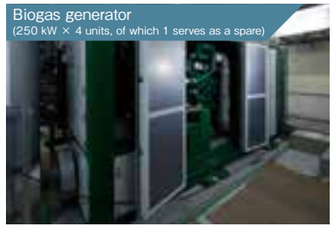
Name: Machida City Bio-energy Center
Treatment capacity: Heat recovery facility (waste incineration facility):
258 tons per day (129 tons per day × 2 units)
Biogas recovery facility: 50 tons per day (25 tons per day × 2 units)
Unburnable/bulk waste processing facility: 47 tons per 5 hours
Generation systems: Waste incineration facility: 6,220 kW; biogas recovery facility: 750 kW
Design and construction: Takuma Co., Ltd.
Operation: Machida High Trust Co., Ltd.
Project dates: December 22, 2016, to June 30, 2024 (start of operation: January 1, 2022)

System combining methane fermentation and incineration components

This combined-system facility, which pairs methane fermentation with incineration, consists of a biogas recovery facility that recovers biogas from garbage through methane fermentation and a waste incineration facility that incinerates waste that is not suited to methane fermentation. By performing biogas power generation using methane fermentation and steam turbine power generation using incineration as appropriate based on the properties of the waste being processed, the facility is able to make maximum possible use of the energy contained in waste.

Additional power-generation initiatives at the site, including solar power generation, micro wind power, and hydropower utilizing cooling water used at the facility, further reduce CO_2 emissions.

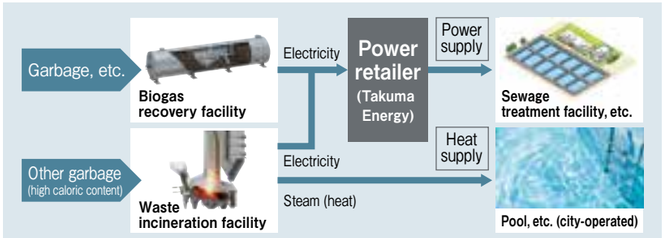

Methane fermentation tank


Biogas generator
(250 kW × 4 units, of which 1 serves as a spare)


Steam turbine generator
(6,220 kW)

Realizing local production and consumption of energy

Electricity generated at the facility is supplied to the city's sewage treatment plant via Takuma Energy Co., Ltd., while steam is used to warm the city's heated swimming pool, which is located adjacent to the site, as part of a series of initiatives to return energy created from waste to the local community.



A facility where visitors can learn, play, and grow

The facility's visitor area includes unique spaces as well as hands-on and experience-based exhibits that let visitors have fun while learning about recycling at its bulk and unburnable waste treatment facility, biogas power generation, and waste incineration treatment.


A quiz about waste sorting


A hands-on booth where visitors can learn about biogas power generation systems


An experience-based learning area where visitors can learn about incineration

Message from the engineering coordinator

This composite facility combines conventional incineration and unburnable/bulk waste treatment facilities with a biogas recovery facility, making it a state-of-the-art environmental facility that can generate electricity from various types of energy (steam, biogas, solar power, hydropower, and wind power). Construction was impacted by the COVID-19 pandemic, and I would like to thank everyone involved for the hard work that made a successful outcome possible despite constraints on meetings, supplies, and human resources. I hope the Center will see long use as a regional energy facility and as an important place of environmental learning.

Jun Watanabe **Assistant Manager, Section 2, Environmental Design Dept. 3**
Takuma Co., Ltd.

An advanced exterior design that blends into the surrounding environment

The design limits the height of buildings at the site to reduce its presence out of consideration for the surrounding residential area. The administrative building, which welcomes visitors, adopts an advanced, open-feeling design incorporating a curved roof and a glass curtain wall. Incorporation of greenery into wall surfaces and the roof creates synergistic effects with surrounding tree growth. The front of the facility incorporates a gate park and three terraces that are open to the public, creating spaces where residents can gather, meet, and relax.


Glass curtain wall


Ecovoid


Wall Greenery


Gate Park


Sky Terrace


Work Terrace

Contributing as a disaster-prevention facility in times of emergency

The facility features an earthquake-resistant design that allows its buildings to continue functioning in the event that an earthquake with a seismic intensity of 6+ were to strike directly underneath Tokyo. In addition, since biogas generation in the site's methane fermentation tanks can continue even in the event of an interruption in the supply of outside power, the facility can continue to process waste in the event of a disaster by relying on biogas power generation and emergency power generation.

The administrative building's training room and large conference room can be used as shelter space to accommodate 100 people in the event of an emergency, with power generated on-site providing electricity for necessary lighting and air conditioning. In addition to storing enough water for 300 people along with a variety of disaster-prevention supplies, the facility has shelter-related equipment like the Kamado Bench, a bench that can be converted into wood-fired cooking stations, and underground sewage pipes that can be connected to temporary toilets.

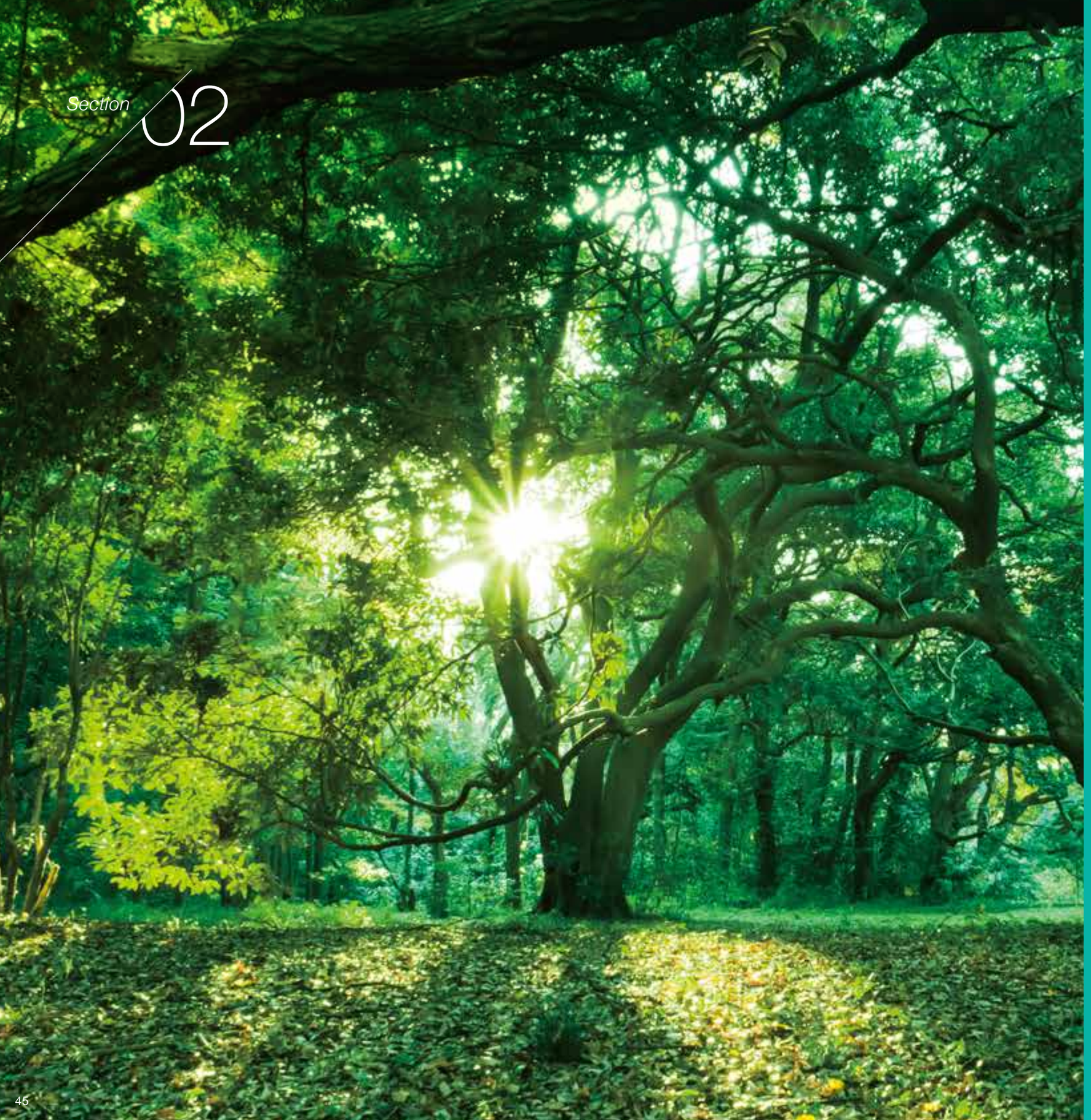

Conference room that can be used as shelter space in the event of an emergency


Kamado Bench

Message from the operation management company

At-scale deliveries of waste began in November 2021, prior to the completion of the facility, which was able to open on January 1, 2022, without major incident. As the Tokyo metropolitan area's first biogas recovery plant, the facility is attracting attention from Tokyo and other nearby local governments. All of our employees look forward to working together to ensure the facility will be able to operate and supply energy safely so that city residents can go about their lives with peace of mind.

Toru Shimajiri **Site Manager, Machida City Bio-energy Center**
Machida High Trust Co., Ltd.



ESG Initiatives

Helping Combat Climate Change: Conserving Resources and Protecting the Environment

The Takuma Group recognizes the need to promote renewable energy (non-fossil energy), improve energy efficiency, conserve resources and reduce environmental impacts, and use unutilized resources effectively. As one way to do that, we will work to alleviate the global issue of climate change and to reduce environmental impacts while helping realize a sustainable society by supplying products and services that draw on technologies for effectively utilizing energy and protecting the environment that we have developed over more than 80 years of history.

TAKUMA Environmental Policy

Our company has established the "TAKUMA Environmental Policy" as follows, aiming to ensure employees contribute to global environmental conservation.
This 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 Enhance employees' 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.

Takuma's contribution to reducing CO_2 emissions

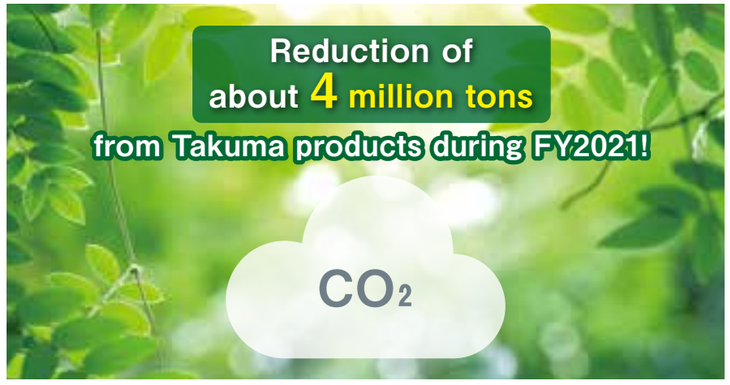
Conversion of waste and biomass into energy by municipal solid waste incineration plants and biomass power plants supplied by Takuma helps reduce CO_2 emissions by about 4 million tons per year.

Reduction in CO_2 emissions from municipal solid waste incineration plants delivered by Takuma

Approx. 500,000 tons per year!

Reduction in CO_2 emissions from biomass power plants delivered by Takuma

Approx. 3.5 million tons per year!

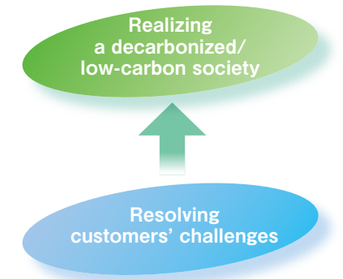


Helping combat climate change | Initiatives through our energy plant business

As a pioneer in the boiler industry with many years of experience, we have helped customers resolve the issues they face by delivering a diverse range of boilers and plants in large quantities.
Alleviating climate change and realizing a decarbonized society have been cited in recent years as issues that demand a society-wide response, and renewable energy, including solar power, wind power, geothermal power, small- and medium-scale hydropower, and biomass, has an important role to play in addressing those issues.
Because it absorbs carbon dioxide through photosynthesis during the growth period of raw materials like thinned lumber, the wood fuel used in biomass boilers, one of our flagship products, is distinguished by being carbon-neutral, insofar as it does not affect the atmospheric concentration of carbon dioxide, including when lumber is used as a source of energy. We will help resolve issues faced by customers and society by promoting renewable energy through utilization of wood biomass.

■Contributions through advanced technology and after-sales service

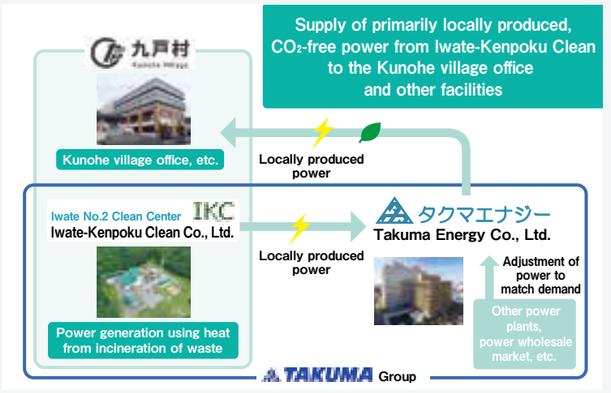
Most fuels used by biomass power plants, boiler plants, and industrial waste treatment plants, which are flagship products of our Energy Plant Business, differ from fossil fuels in that they do not exhibit uniform properties, making it difficult to realize stable combustion.
Drawing on advanced combustion and control technologies as well as extensive experience, we achieve high operational availability by choosing the optimal combustion model for customers' plans so that we can supply plants characterized by high transmission end efficiency and boiler efficiency. Our work continues after each facility begins operating as we facilitate stable facility operation over the long-term through an extensive menu of after-sales services, including maintenance, renovation work, Operation management and Maintenance management (O&M), and supply of locally produced CO_2-free power for local consumption in partnership with our subsidiaries.
Going forward, we will strive to realize a decarbonized/low-carbon society while helping customers resolve the challenges they face by supplying high-efficiency plants and working to ensure that facilities operate in a stable manner over the long-term.



Example initiatives

Supplying locally produced CO_2-free power for local consumption as part of a decarbonization initiative in the Kunohe Village, Iwate Prefecture

Group company Takuma Energy Co., Ltd., and Iwate-Kenpoku Clean Co., Ltd., entered into an agreement with the Kunohe Village in Iwate Prefecture promoting the decarbonization of the local community through use of locally produced power. In accordance with this agreement, Takuma Energy will supply power generated by Iwate-Kenpoku Clean to the Kunohe village office and other facilities. The supplied power, which is CO_2-free, will contribute to the development of the village, which is striving to reduce greenhouse gas emissions and build a Regional Circular and Ecological Sphere (Regional CES).

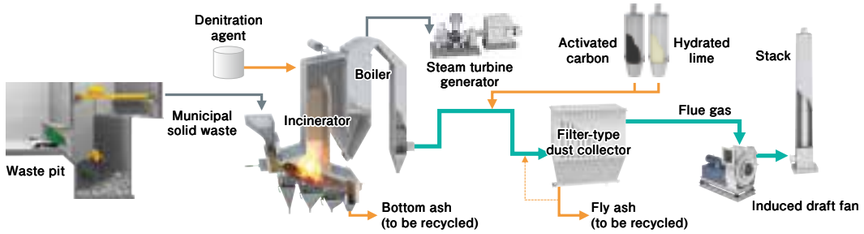


Conserving resources and protecting the environment

Initiatives through the Municipal Solid Waste Treatment Plant Business

Since delivering Japan's first fully continuous mechanical waste incineration plant in 1963, Takuma has built and delivered more than 360 municipal solid waste treatment plants, the most of any manufacturer in Japan. Most of the treatment technologies used by plants are the result of in-house R&D by Takuma, which continues to embrace the highest standards of excellence while working to refine its technologies so that they can accommodate the needs of society it changes over time.

Takuma contributes to resource conservation and environmental protection through a broad product line and after-sales service based on an extensive track record as the industry's leading company.

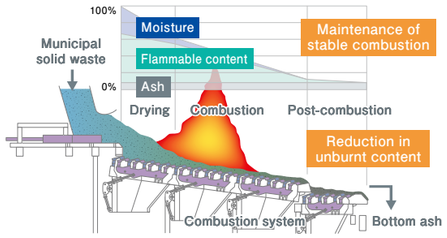


1 Resource conservation initiatives

We contribute to the formation of a Sound Material-Cycle Society by working to improve incineration and flue gas treatment technology, promoting recycling of ash, and reducing use of chemical agents.

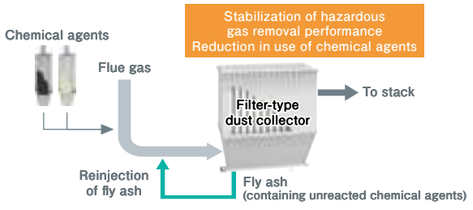
●High-performance stoker furnace

We draw on the treatment experience that comes from having Japan's No.1 track record of deliveries to improve our stokers. We pursue the ash recycling business by maintaining stable combustion despite a diverse range of waste properties and creating bottom ash with few embers that exhibits uniform properties, making it well suited for use in cement production.



●Fly ash circulation system

Fly ash collected by filter-type dust collectors contains chemical agents used to remove toxic chemicals (hydrated lime and activated carbon) that are still capable of removing toxic chemicals. This system consists of technology for utilizing such chemical agents to maximum effect by reducing chemical agent use and fly ash volume so that fly ash can be recycled efficiently and economically.

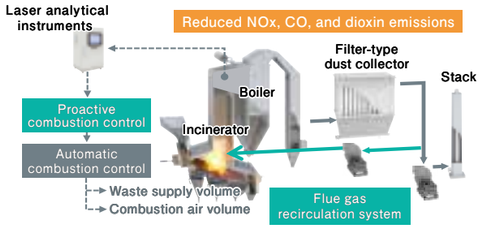


2 Environmental protection initiatives

The healthy environment in the surrounding community is safeguarded by reducing generation of toxic substances during the combustion process, for example by using AI in combustion technology.

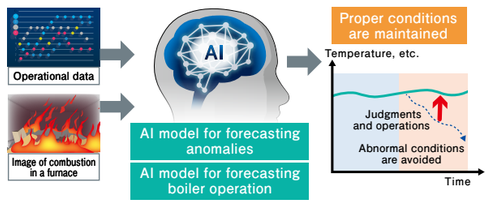
●Advanced combustion system

Takuma's advanced combustion system, whose components include proactive combustion control, which uses a laser analytical instruments to boost response, as well as a flue gas recirculation system, reduces generation of toxic substances like dioxins, nitrogen oxides, and carbon monoxide during waste incineration.



●AI-enabled combustion control system

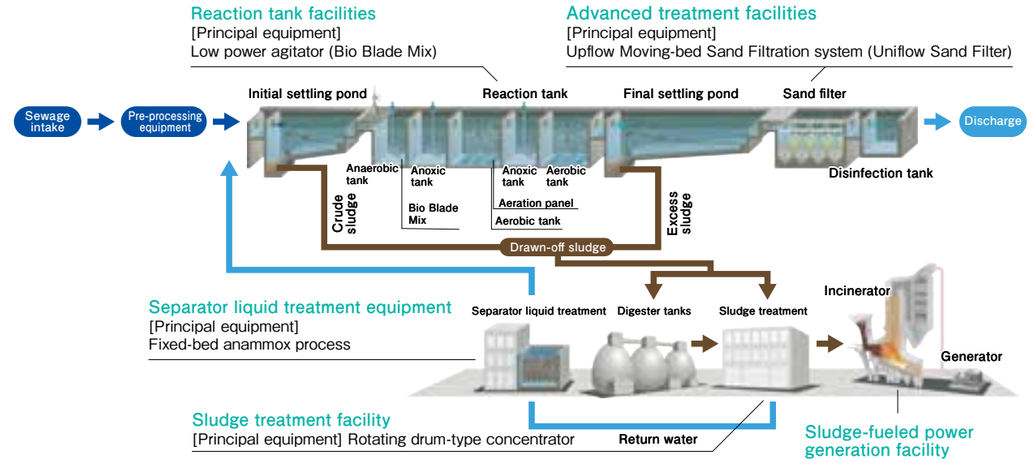
This next-generation combustion control system, which uses AI technology, reproduces the operational skills of experienced operators. Since the system precisely forecasts combustion fluctuations that are unique to waste incineration to determine and implement the appropriate response, stable combustion conditions can be maintained at all times, even when the properties of the waste fluctuate over the medium- and long-term.



Conserving resources and protecting the environment

Initiatives through the Water Treatment Plant Business

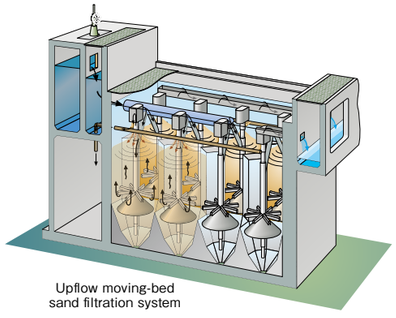
We have operated our Water Treatment Plant Business with a focus on sewage facilities for more than 50 years, and during that time we have worked to conserve water resources and the water environment required by society by providing a variety of water treatment technologies. In recent years, companies in this sector have been called upon to address social needs involving priorities such as energy conservation, energy creation, and Life Cycle Cost (LCC) reductions. In response, we have helped realize sustainable sewage systems by taking advantage of the reliable technology and extensive experience we have developed to date.



Processing flow in water treatment plant equipment at a sewage facility

1 Upflow moving-bed sand filtration system

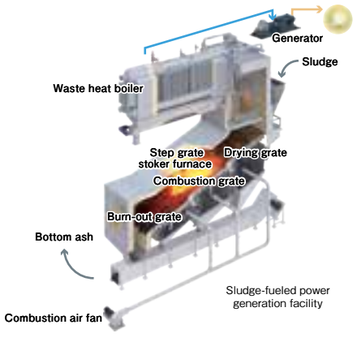
Our upflow moving-bed sand filtration system (Uniflow Sand Filter), which removes Suspended Solids (SS) from water, is primarily used for final treatment at sewage treatment plants to allow clean, treated water to be released into rivers. Some treated water is also reused at the facility, helping to conserve water resources. Uniflow Sand Filter systems boast top domestic market share in moving-bed sand filtration systems, and we have delivered more than 2,700 of these long-selling products, which feature water quality purification technology, in Japan. In recent years, many of the systems we have delivered have been a new high-speed model that delivers two to three times the treatment volume with the same area as conventional fixed-bed sand filtration systems. We are also seeing more projects that replace fixed-bed sand filtration systems with this system while retaining existing foundation work and related infrastructure.



Upflow moving-bed sand filtration system

2 Step grate stoker type sewage sludge incineration and power generation system

Sludge generated by the sewage treatment process is a type of biomass, and such resources are expected to be used as renewable energy. Conventional sludge incineration were net consumers of energy because they required auxiliary fuel and used large amounts of electricity, but this system draws on the core Takuma technologies of combustion technology and boiler technology to make possible an energy-creating system that generates more power than the incinerator consumes while using sludge as fuel, as long as it operates at or above a certain scale.



Sludge-fueled power generation facility

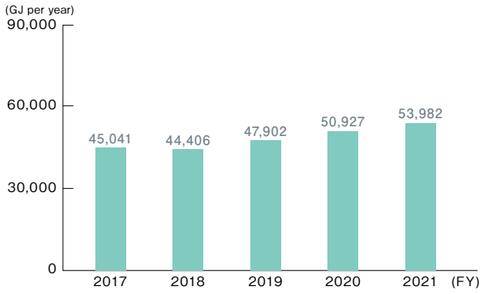
Environment: Environmental Initiatives

Environmental reporting

Takuma reports the environmental impact of its business activities as well as the manner in which it takes environmental considerations into account in accordance with the Environmental Reporting Guidelines (issued by the Ministry of the Environment). This environmental reporting program includes not only environmental information extracted from our overall business activities from an environmental standpoint, but also information about related economic and social aspects of those activities.

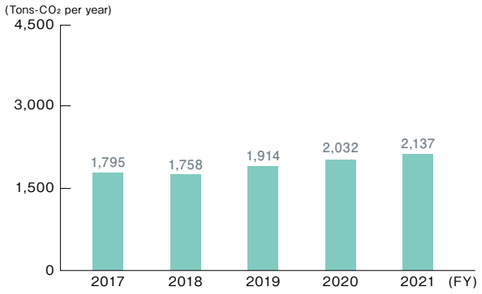
■Environmental data (non-consolidated)

Total energy input volume



The total energy input volume of the fuel and the electricity consumed at Takuma during FY2021 rose slightly compared to FY2020 levels. We will continue to promote energy savings from here on out.

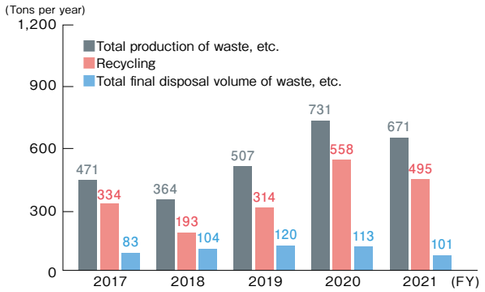
Greenhouse gas emissions



The greenhouse gas emitted by Takuma is limited to carbon dioxide (CO_2). The amount of CO_2 emissions in FY2021 rose slightly compared to FY2020 levels. We will continue striving to reduce CO_2 emissions.

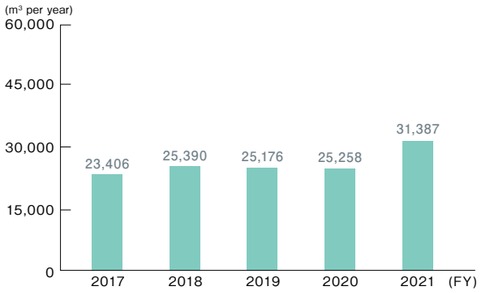
*Annual values for individual providers' adjusted emission factors have been used.

Total production of waste, etc.



Waste generated by Takuma during FY2021 fell slightly compared to FY2020 as appropriate processing such as recycling led to a reduction in the volume of waste subject to final disposal. Going forward, we will work to further reduce the amount of waste we generate. Although we work to recycle and reuse waste, waste that cannot be reused is disposed of in accordance with the Industrial Waste Control Manifest System.

Input volume of water



Water resource inputs by Takuma during FY2021 increased compared to FY2020. We will continue striving to reduce water resource inputs.

■PRTR target substance 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 the Pollutant Release and Transfer Register (PRTR) Law, in accordance with relevant laws and ordinances, with the local government.

●Dichloromethane (CAS No. 75-09-2)

FY	2017	2018	2019	2020	2021
Emissions (tons per year)	0.45	0.27	0.08	0.00	0.00

●Ethylbenzene (CAS No. 100-41-4)

FY	2017	2018	2019	2020	2021
Emissions (tons per year)	0.96	0.98	1.34	1.41	1.51

●Toluene (CAS No. 108-88-3)

FY	2017	2018	2019	2020	2021
Emissions (tons per year)	0.07	0.06	0.09	0.07	0.13

●Xylene (CAS No. 1330-20-7)

FY	2017	2018	2019	2020	2021
Emissions (tons per year)	1.18	1.12	1.47	1.54	1.62

These materials are used for antirust painting of boiler structures and so on.

■Environmental accounting

Environmental accounting is the process by which companies and other entities recognize the cost of environmental conservation in their business activities as well as the effects of those activities and measure and communicate them in as quantitative a manner as possible (either in terms of monetary amounts or amounts of materials) with the goal of pursuing environmental conservation initiatives in an efficient and effective manner while maintaining a good relationship with society so as to facilitate sustainable development.

We have disclosed our own environmental accounting system since FY2006 when we introduced it based on the "Environmental Accounting Guidelines 2005" issued by the Ministry of the Environment. Because the Group's flagship products include environmental conservation plants and equipment, employees exhibit a high awareness of the importance of environmental conservation, a goal that the Group works to achieve.

Environmental conservation cost

Item	Investment (thousand JPY)	Expense (thousand JPY)
Business area costs		
Pollution prevention costs	18,032	15,286
Global environmental conservation costs	3,371	16,742
Resource circulation costs	-	34,036
Administration costs	-	30,398
R&D costs	74,323	1,695,632
Social activity costs	-	12,513
Total	95,726	1,804,607

Investments and expenses related to the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities are measured in monetary value.

Economic benefits of environmental conservation measures

Breakdown of benefits	Income from the sale of waste for recycling, etc. (thousands of yen)	12,396

Economic benefits of environmental conservation measures, defined as contributions to the profit of a company or other entity derived from having pursued environmental conservation measures, are measured in monetary value.

Environmental conservation effect

Item	FY2020	FY2021
(1) Environmental conservation benefit related to resources input into business activities		
Total energy input volume (GJ)	103,839	109,051
Input volume of water (m³)	47,295	52,425
(2) Environmental conservation benefit related to waste or environmental impact originating from business activities		
Volume of greenhouse gas emissions (tons-CO_2)	4,422	4,587
Total production of waste, etc. (tons)	1,209	1,167
Final waste disposal volume (tons)	164	148
Wastewater volume (m³)	47,299	51,926

Environmental conservation benefits are measured in physical units and are the benefits obtained from the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities.

Period covered: April 1, 2021, to March 31, 2022
Scope of statistics: The following companies are included in these statistics.
Domestic: Takuma Co., Ltd., (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.; Sunplant 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 Co., Ltd.; and TECHNO LINKS Inc.
Overseas: Taiden Environtech Co., Ltd., and Siam Takuma Co., Ltd.

Environmental management

The situation concerning the acquisition of ISO 14001

The Harima Factory has earned ISO 14001 certification, and it practices environmental management activities in accordance with an environmental management system that is designed to comply with international standards.

Our group companies Nippon Thermoener Co., Ltd.; Takuma Technos Co., Ltd.; Hokkaido Sanitary Maintenance Co., Ltd.; and Dan-Takuma Technologies Inc. have also acquired ISO 14001 certification.

Disclosing information based on TCFD recommendations

1 Basic approach

Vision 2030, our long-term vision for the Takuma Group 10 years in the future, includes this statement: “Aim to maintain our role of being an indispensable presence in society as a leading company in the field of renewable energy utilization and environmental protection by realizing sustained growth alongside our customers and society through implementation of ESG management”. Because the direction we are pursuing in our businesses accords with the general thrust of social pressure for reducing greenhouse gas emissions and bolstering the resilience of infrastructure as natural disasters grow more severe, we have identified helping combat climate change as one of the key issues (Materiality) that deserve to be addressed on a priority basis. Moreover, in April 2022 we announced our support for the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). As the Group works to realize its corporate vision, we will strive to enhance initiatives that help realize a sustainable society by resolving issues faced by customers and society through the provision of products and services and by reducing our own CO_2 emissions. In addition, we will work to increase the sophistication of our approach to climate change and of our information disclosure initiatives through dialog with stakeholders.

2 Governance

We consider contributing to measures addressing climate change to be an important management priority, and we are pursuing a series of companywide initiatives under monitoring structures put in place by our Board of Directors. The Executive Manager, Corporate Planning & Administration Division (secretariat: Corporate Planning Department), who serves as the executive in charge of dealing with climate change, requests or instructs involved departments to cooperate, gathers information about how climate change will impact our businesses as well as associated initiatives, evaluates the risks and opportunities posed by climate change, and reviews the status of related initiatives. This information is then reported to the Board of Directors following discussion by the Committee of Executive Officers as necessary. The Board of Directors supervises the state of Takuma’s initiatives to combat climate change as well as their consistency with the company’s business policies (in principle, meeting once every year), reviewing policies as necessary and determining strategy.

3 Strategy and scenario analysis

After taking into account multiple scenarios announced by the Intergovernmental Panel on Climate Change (IPCC) and International Energy Agency (IEA), and referring to various materials released by the Ministry of Economy, Trade and Industry and the Ministry of the Environment, we established the two scenarios described below (one assuming a temperature rise of less than 2°C, and the other a rise of 4°C). We then analyzed the two scenarios with a focus on our domestic Environment and Energy Business, a flagship business that accounts for the majority of the Group’s sales and a segment of our operations that is likely to be affected by climate change. We conducted this analysis through 2030, the final year of Vision 2030, our long-term vision, in an effort to identify the risks and opportunities that climate change would pose for our operations and to summarize the measures that we could undertake to resolve associated issues.

Established scenario	Overview	Reference scenario(s)
2°C scenario	A scenario in which progress in decarbonization restrains the average worldwide temperature increase to less than 2°C, as set forth in the Paris Agreement	NZE, SDS, and APS (IEA) RCP 2.6 (IPCC)
4°C scenario	A scenario in which a lack of progress in decarbonization results in an average worldwide temperature increase of 4°C or greater	RCP 8.5 (IPCC)

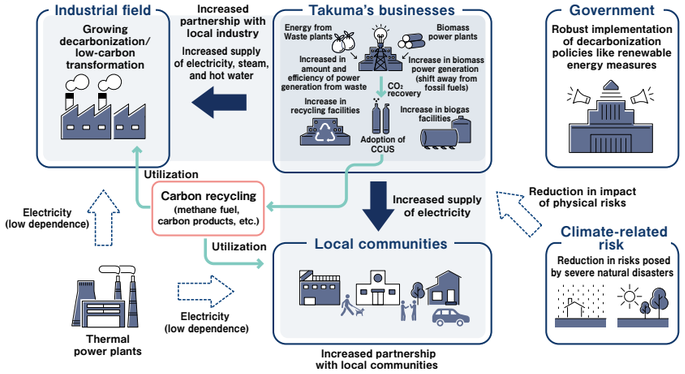
Note
NZE: Net Zero Emissions Scenario; SDS: Sustainable Development Scenario; APS: Announced Pledges Scenario;
RCP: Representative Concentration Pathways Scenario

(1) Process for identifying risks and opportunities

We identified key risks and opportunities after extracting risks and opportunities posed by climate change from the standpoint of all value chains in the analyzed businesses, including sales, engineering, procurement, and construction, and evaluating them using a three-tier scale based on the extent of their impact on those businesses. Risks and opportunities identified as having a major impact on our businesses included strengthening of regulations and policies related to CO_2 emissions, changes in the energy mix, changes in societal and customer needs, and intensification of abnormal weather.

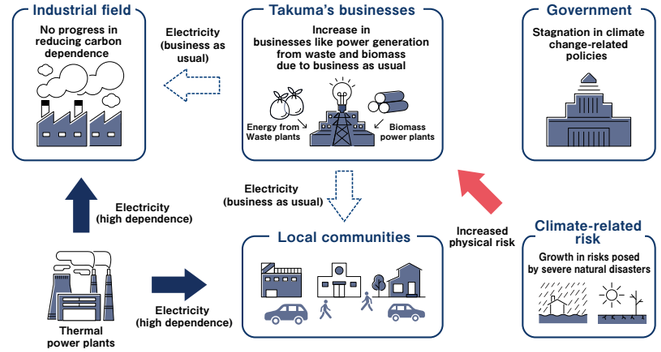
(2) Overview of scenario analysis

In a world that warms by 2°C, the number of renewable energy power sources in communities will increase, with a focus on independence and decentralization. Development of decarbonization technologies will spur adoption of CO_2 recovery and carbon recycling in society.



In the scenario where the average global temperature rises by less than 2℃, demand for technologies like biomass power generation and generation from waste incineration, which are flagship Takuma products, will grow due to changes in the energy mix and increased interest in renewable energy. In addition, stronger partnerships between Takuma plants and local industry (agricultural facilities, industrial parks, etc.) through the supply of steam, hot water, electricity, and other forms of energy can be expected to lead to increased opportunities for our businesses, even as falling new-construction and replacement demand for waste incineration plants due to implementation of the 3R approach (Reduce, Reuse, and Recycle) and the need to address new needs such as Carbon dioxide Capture, Utilization and Storage (CCUS) can be anticipated to pose transition risk. To address these risks, we will look to reduce risks while expanding businesses that take advantage of associated opportunities, for example by enhancing our recurring revenue model businesses, including maintenance, operation management, and O&M, by proposing optimal solutions that have been custom-tailored for individual customers; strengthening product groups that do not depend on incineration, for example biogas recovery plants and recycling plants; and continuing R&D geared to realize carbon neutrality, for example through CCUS.

In a world that warms by 4℃, physical risks will grow as we fail to reduce or eliminate carbon dependence.



In the 4℃ scenario, frequent, intensifying extreme weather will cause delays in material procurement and construction, raising concerns about impacts on business costs, including with regard to construction schedules. We will address this risk by standardizing parts and equipment and optimizing inventories of parts, material, and equipment through our Supply Lab (after-sales service facility), and by strengthening Business Continuity Plan (BCP), for example by ensuring sufficient risk buffers and hedging against risks with insurance and agreements.

Our strategy through FY2023, which has been formulated with a view towards 2030, is reflected in the 13th Medium-Term Management Plan.

Environment: Environmental Initiatives

(3) Summary of scenario analysis results

Item			Overview of risks and opportunities		Countermeasures	Impacts	
2°C scenario	Policy and law	Introduction of carbon pricing	Business costs will rise following the introduction of carbon pricing such as carbon taxes.	Risks	●Implementation of Takuma initiatives related to energy savings and decarbonization ●Future initiatives to reduce greenhouse gas emissions in collaboration with suppliers		There are risks, but they can be addressed
		Strengthening of regulations and policies related to CO_2 emissions	Climate change measures will become a requirement for bidding government contracts, and progress in implementing initiatives preparing for a decarbonized society will impact opportunities for earning orders.	Opportunities Risks	●Initiatives to eliminate carbon dependence and realize a Regional Circular and Ecological Sphere (Regional CES), for example equipping municipal solid waste treatment plants with CCUS technology ●Progressive and steady reductions in greenhouse gas emissions from Takuma's business activities		Addressing these risks will lead to increased business opportunities
		Changes in the energy mix	Governmental energy mix policies and increasing interest in renewable energy will spur demand for biomass power generation and high-efficiency waste incineration and power generation, which are flagship Takuma products.	Opportunities	●Enhancement of internal resources in terms of both quality and quantity in response to demand growth ●Utilization of digital technologies and ongoing strengthening of R&D and engineering capabilities		Increased business opportunities
		Review of programs designed to support adoption of renewable energy, for example FIT and FIP	Demand for biomass power plants will shrink as factors including reassessment of the standards for biomass fuel lead to a reduction in renewable energy adoption incentives for biomass power generation.	Risks	●Maintenance and expansion of Takuma's market presence in small and medium-size biomass power generation, where the impact of fuel regulations is assumed to be comparatively limited ●Capture of demand that does not depend on FIT/FIP, for example fuel conversions for industrial boilers		There are risks, but they can be addressed
	Market	Changes in society and customer needs	Strengthening of 3R (Reduce, Reuse, and Recycle) initiatives will lead to a reduction in the amount of waste that is incinerated, pushing down demand for waste incineration plants.	Risks	●Strengthening of ability to accommodate treatment methods that do not depend on incineration, for example biogas recovery plants and material recycling, in response to market trends (although these trends will not spur an abrupt decline in demand for incineration facilities as of 2030) ●Strengthening of recurring revenue model businesses such as maintenance, operation management, and O&M		There are risks, but they can be addressed
			Demand for strengthening of partnerships with local industry (agricultural facilities, industrial parks, etc.) through the supply of steam, hot water, electricity, and other forms of energy and for the ability to function as disaster prevention facilities will grow.	Opportunities	●Supply of optimal solutions based on precise assessments of diversifying customer needs and changes in the business environment ●Development of new business schemes and strategic partnerships		Increased business opportunities
	Technology	Adoption of decarbonization, renewable energy, and energy-saving technologies	Demand for solutions for realizing carbon neutrality (hydrogen power generation, ammonia power generation, CCUS, etc.) will grow.	Opportunities Risks	●Development of decarbonization technologies such as CO_2 management technology and carbon-free technology ●Implementation of the technologies necessary for eliminating carbon dependence and realizing a Regional Circular and Ecological Sphere (Regional CES), for example equipping municipal solid waste treatment plants with CCUS technology		Addressing these risks will lead to increased business opportunities
4°C scenario	Physical risks (chronic)	Rising average temperatures	The operational efficiency of employees, workers, and others will fall due to heat illness and other related factors.	Risks	●Reduction in, and streamlining of, outdoor work times through utilization of digital technologies, drone technology, and other resources		There are risks, but they can be addressed
	Physical risks (acute)	Increasing severity of extreme weather	Frequent, intensifying extreme weather will cause delays in material procurement and construction, impacting business costs, including with regard to construction schedules.	Risks	●Implementation of part and equipment standardization and sharing ●Setting aside of appropriate inventory of parts, materials, and equipment (utilizing Supply Lab) ●Strengthening of BCP measures, including hedging of risks with insurance and contract conditions		There are risks, but they can be addressed

4 Risk management

We established a working group including outside experts with the Planning Department as its secretariat, identified risks and opportunities characterized by major impacts on our management and financial operations, conducted a scenario analysis, and reported the evaluation and analysis results to the Board of Directors. The Board of Directors supervises the state of Takuma's initiatives to combat climate change through this report.

In addition, Takuma is building companywide risk management structures based on its Risk Management Code, and the departments that operate its businesses conducts risk management through measures such as identifying, avoiding, transferring, and reducing risks with the potential to adversely affect its businesses. Going forward, we will integrate climate change risks into these risk management structures, and give the Compliance & CSR Promotion Division responsibility for centralized management.

5 Indicators and targets

As we work to realize both initiative toward net-zero GHG emissions by 2050 and Vision 2030, Takuma's long-term vision, we will resolve issues faced by customers and communities by proposing products and services that contribute to energy savings and decarbonization while working to reduce our own CO_2 emissions.

>>1 CO_2 emission reduction targets through our own products and services

Magnitude of potential reduction in CO_2 emissions due to newly delivered power plants*

FY2023
800,000 tons per year

FY2030
2.5 million tons per year

*Biomass power plants and Energy from Waste plants delivered from FY2021 to FY2030

>>2 In-house CO_2 emissions reduction targets

FY2023
Effectively zero CO_2 emissions
for Scope 1 and Scope 2 at the Takuma head office and the Harima Factory

FY2030
Effectively zero CO_2 emissions
for Scope 1 and Scope 2 at all Takuma domestic worksites (Head Office, branch offices, factory, and construction sites)

・FY2030 targets including group companies remain under consideration.
・CO_2 emissions from procured products and use of Takuma products by customers (Scope 3) also remain under consideration.

Strengthening Relationships of Trust with Customers and Communities

Working through initiatives to pursue customer satisfaction, ensure the stable and continuous operation of plants and equipment, and create new value for regional resource recycling and communities, the Takuma Group will maintain and strengthen relations of trust with customers and communities by supplying high-quality products and services that facilitate stable, long-term operation on an ongoing basis in the form of infrastructure that supports regional society and customers' businesses.

Pursuing customer satisfaction

In recent years, the amount of attention paid by society to not only manufacturing and service, but also quality across a wide range of fields, has been growing. Against this backdrop, it will be necessary not only to increase the quality of products, but also to improve management of operations and quality in each process from plant planning to delivery (including sales, planning, design, procurement, manufacturing, construction, and management) and employees' operational capabilities so that we can supply products and plants that satisfy customers.

To that end, our Head Office, branch companies, and branch offices have earned certification under ISO 9001 (Quality Management Systems), and the Harima Factory has earned certification under ISO 9001 and ISO 14001 (Environmental Management Systems). We are working to improve the quality of operations, products, and business processes in accordance with the latest 2015 editions of those standards.

Quality Policy

Takuma Co., Ltd., has adopted the following Quality Policy in order to provide satisfying products that meet customer expectations and earn a high level of trust while continuously improving the effectiveness of its quality management system.

Quality Policy Manufacturing products that result in customer satisfaction

In keeping with the above Quality Policy, we have identified the three priority items listed below. Recognizing those items, we are undertaking a variety of initiatives to increase the quality of products and business processes in all processes, including sales, planning, design, procurement, manufacturing, construction, and management.

1 Priority items

Creating value to earn customer satisfaction ····· Ascertaining customer needs and making improvements based on past experience

Carrying out risk management ····· Addressing changes in the business environment and human error

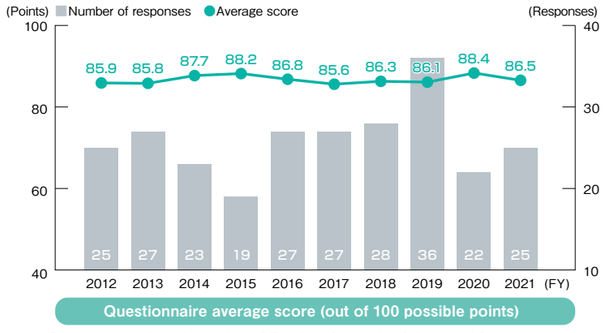
Implementing human resources management ····· Implementing human resource development and ensuring skills are passed down to younger employees

2 Principal initiatives to improve quality

- Establishing quality targets for each division's processes; monitoring, measuring, and evaluating implementation status (twice a year)
- Holding QM Committee meetings (quality management reviews, twice a year)
- Holding internal quality audits to evaluate the status of management systems in individual divisions' processes (once a year)
- Using operational skill achievement checklists designed to improve employees' operational skills (once a year)

3 Customer satisfaction survey

We administer a customer satisfaction survey covering the entire construction process, including work performed, delivered equipment, and employee service, targeting customers for which construction projects are completed. Our QM Committee analyzes the status quo and studies measures for improving quality based on feedback from customers in a timely manner, working to improve the quality of the products we supply to customers and of our own internal operations by applying lessons learned horizontally across the organization.



Scores averaging higher than 85 points for each of the last 10 years indicate a positive evaluation of these efforts.

Participation in the community

Takuma and its group companies strive to deliver safe, trustworthy facilities that allow local residents to live with peace of mind by disclosing information in an appropriate manner, participating in local activities, and actively seeking interactions with local residents, for example by staging clean-up activities in the areas near facilities, hosting events at which local residents can gather, and orchestrating evacuation exercises envisioning natural disasters.

Although these efforts have been impacted by the COVID-19 pandemic in recent years, we continue to pursue them while taking steps to prevent infection. This section introduces some examples.

Waste-sorting board game

Local residents enjoying the board game

Amagasaki City SDGs Fair in ODA 2021

We participated in "SDGs Fair in ODA 2021", which was hosted in November 2021 by the City of Amagasaki's Oda Region Section to deepen understanding of the UN's Sustainable Development Goals (SDGs).

Staff at our booth joined visitors in playing a waste-sorting board game that we created with the local non-profit organization Amagasaki Environmental Open College.

The game featured quiz questions about waste-sorting rules in Amagasaki. Players earned coins when they answered questions correctly and exchanged them for environmental points, the total of which determined the winner.

The booth attracted numerous attendees, particularly families, who had fun while learning about waste sorting in Amagasaki through the quiz.

Initiatives designed to ensure stable plant operation

The Takuma Group manages facilities under contract from many local governments as part of its long-term comprehensive operation business, which offers turnkey operation and maintenance management service for municipal solid waste treatment plants and other DBO projects.

Since drawing on the extensive expertise that we have developed in the area of plant operation and maintenance management to date to earn our first private-sector O&M (Operation management and Maintenance management) contract from SARA Incorporated in 2019, we have received contracts for plant O&M operations from multiple private-sector customers.

At each site, operational status and equipment operation data collected and analyzed by our Plant Optimization Comprehensive Support System (POCSYS※) provides valuable feedback for facility operations. As part of a continuing program of initiatives geared to ensure safe, secure facility operation, we hold monthly liaison meetings with customers to report on facility operational status and exchange information.

Going forward, the Takuma Group will continue to realize stable, long-term operation of facilities by drawing on the operation management and maintenance management expertise that Takuma and group company Takuma Technos Co., Ltd., have accumulated over many years of operations.

A daily inspection of a facility

A customer liaison meeting

Pursuing Partnerships and Innovation

Conventional products and services are undergoing a dizzying evolution against the backdrop of progress in the Fourth Industrial Revolution and the evolution of information and communications technology, fueling fast-paced change in society. Working through initiatives to utilize digital technologies and promote open partnerships and innovation, the Takuma Group will look to further bolster its strengths by focusing on proposals based on society's and customers' needs, R&D to facilitate them, and technological improvements so that it can keep up with social change.

Utilization of digital technologies (AI, IoT, robots, and more)

Progress in the Fourth Industrial Revolution and in the development of telecommunication technologies is rapidly transforming conventional products and services. Plant EPC, operation management, and maintenance are no exception, and digitalization in these areas is likely to continue to accelerate, albeit against the backdrop of labor shortages and restrictions on in-person work imposed as a result of the COVID-19 pandemic. Takuma is pursuing development and other initiatives from a medium- and long-term perspective so that we can create added value, for example by realizing technologies facilitating remote and fully automated operation of plants, streamlining and reducing labor requirements for operations by utilizing data, and strengthening competitiveness in the areas of EPC and after-sales service.

1 Increases in the added value of facilities and plants

In addition to providing 24-hour remote monitoring and operational support through Solution Lab, our remote monitoring and operational support facility, we are working to realize stable plant operation through such measures as facilitating stable operation by collecting and analyzing plant operational data and by optimizing maintenance.

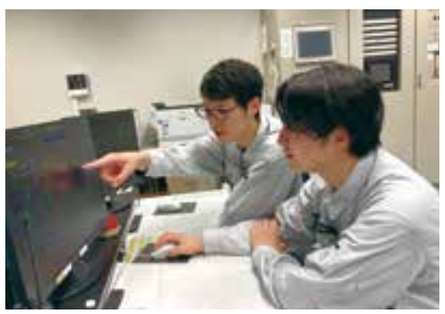
Topics

Operational support through AI-enabled combustion stabilization technology and remote operation

We developed a combustion AI that can make decisions on par with those of experienced operators. By combining this AI with conventional automatic combustion control technology, we have been able to reduce manual operation by operators by 99% while maintaining stable combustion. In addition, we have realized stable facility operation through remote operation when operating at reduced staff levels.

2 Strengthening of competitiveness in EPC operations, operation management, and maintenance service

Plant EPC, operation management, and maintenance require many years of experience, and our accumulation of such experience since our founding has become a core Takuma strength. To reliably pass on experience and skills so that we can provide high-quality EPC and after-sales service, we are working to further improve individual employees' skills by using digital technologies to transform knowledge and expertise into formal, explicit knowledge. Moreover, we are working to strengthen competitiveness in EPC and after-sales service by investing limited time and human resources in the areas that most deserve such attention, for example by streamlining operations through use of technologies such as Robotic Process Automation (RPA).



Open partnerships

At a time when society is changing rapidly, it is necessary to develop businesses quickly and in a way that transforms those changes into opportunities. By deepening partnerships with other companies and organizations so that we can consistently provide the products and services that customers demand, we will strengthen our ability to propose solutions to customers and accelerate R&D.

1 Expanding resources

We are pursuing partnerships and alliances with companies in related fields as well as M&As in order to strengthen our EPC capabilities.

2 Initiatives to contribute to the maintenance and expansion of existing businesses

To resolve the challenges faced by customers and communities, we are strengthening our ability to propose solutions with the help of partners for knowledge that we lack.

3 Initiatives to create new businesses by promoting open innovation

In addition to joint research with universities and other companies, we are working with other companies to develop new businesses as well as decarbonization technologies.

Topics

Participation in the C2X Project

Takuma is participating in the Carbon to X (C2X) project, an open innovation business platform dedicated to helping realize a decarbonized society. The organization emphasizes commercialization through inter-industry partnerships to promote adoption of technologies for decarbonization and Carbon dioxide Capture, Utilization and Storage (CCUS). By commercializing CCUS technology through the C2X project, for example in businesses that use collected CO_2 as a raw material to produce fuel or chemical products, we will realize a global vision for a sustainable, safe, secure, and comfortable decarbonized society based on cyclical resource flows through adoption of renewable energy.

As a leading manufacturer of municipal solid waste treatment plants, Takuma will contribute to the realization of a decarbonized society by working with local governments and local stakeholders to develop and study next-generation waste treatment plant in order to achieve carbon neutrality by 2050 through C2X.

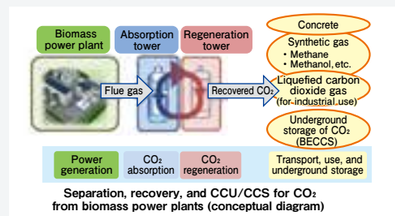
Pursuit of innovation

In recent years, the problem of climate change has sparked calls to realize a decarbonized society through carbon-neutral technology and to pursue additional environmental conservation. Takuma is focused on pursuing R&D and technological improvements in order to develop technologies and products that are sought by society and customers.

Topics

Study of energy-saving CO_2 separation and recovery at biomass power plants Selection for inclusion in a NEDO CCUS R&D and Demonstration Project

In August 2021, Takuma and Nippon Paper Industries Co., Ltd., were chosen by the New Energy and Industrial Technology Development Organization (NEDO) to implement a project entitled "Research, Development and Demonstration Project for CCUS/Investigation Project related to CCUS Technology/Technology Investigation Project related to CO_2 separation & capture and intensive transportation & Utilization for large-scale CO_2 Emission Source/Investigation into Energy-Saving CO_2 Separation & Capture at Biomass Power Plants". The project is scheduled to continue until February 2023.



Separation, recovery, and CCU/CCS for CO_2 from biomass power plants (conceptual diagram)

The project, which uses a biomass power plant (scheduled to start operations in January 2023) operated by Yufutsu Energy Center, LLC, a joint venture of Nippon Paper Industries and Sojitz Corporation, as a model, involves drawing on Takuma's extensive experience, technology, and expertise in municipal solid waste treatment facilities and biomass power plants to study energy-saving CO_2 separation, recovery, and concentration technologies at biomass power plants as well as issues related to the commercialization of those technologies.

By giving direction to the social implementation of technology for separating, recovering, and concentrating CO_2 at biomass power plants; commercializing CCUS technologies; and realizing a Sound Material-Cycle Society through this study project, Takuma will help spur increased adoption of renewable energy and reduction in greenhouse gas emissions.

Promoting Activities of Human Resources

The Takuma Group's human resources have fostered and passed down key strengths in the form of technology, expertise, and trust-based relationships with customers. Through initiatives to strengthen the hiring and development of human resources as well as to promote diversity and improve employee satisfaction, we will continue to ensure that the Group's strengths are effectively passed down and strengthened by using human resources effectively so that employees embodying a diverse range of values can take full advantage of their abilities, and by putting in place structures to keep employee motivation high.

Working with our employees

Takuma has identified using human resources effectively as a key issue as it works to ensure that all employees can make maximum use of their skills and abilities, enjoy engaging work, feel a sense of motivation, and continue their employment over the long-term.

Employee data (non-consolidated)

Number of employees	958 (877 men and 81 women)
Average age	42.9
Average years of service	14.9
Attrition rate	4.3% (past 3 years)

*As of March 31, 2022

Securing and training human resources

1 Initiatives related to securing human resources

As a result of hiring activities that included online information sessions and interviews and numerous other techniques such as referral hiring in an effort to ease the labor shortage, Takuma hired 79 new employees in FY2021, including new and mid-career hires. Going forward, we will focus on ensuring a sufficient workforce, including by taking advantage of online techniques to host information sessions for applicants living in distant areas, and otherwise approaching promising candidates.

Number of newly hired regular employees over the past 7 years
(based on start of employment)
(Figures in parentheses indicate the number of female employees)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022 *New hires only
New hires	18 (1)	24 (2)	21 (2)	20 (2)	25 (3)	26 (2)	28 (4)
Mid-career hires	11 (1)	10 (0)	22 (1)	25 (1)	37 (2)	53 (5)	-
Total	29 (2)	34 (2)	43 (3)	45 (3)	62 (5)	79 (7)	28 (4)

2 Initiatives related to human resources development

We offer human resources education to a broad range of employees, from new hires to management candidates and mid-career hires, to build skills and abilities, improve management skills, and otherwise enhance employee performance.

During FY2021, we worked to enhance our educational programs, for example by offering new training designed to foster effective communication for new-hire employees in their third year.

New-employee training › Technical presentation by 2-year employees › Training for 3-year employees › Thesis discussion by 5-year employees › Presentation by 10-year employees › Mid-career training › Management training

Promoting diversity

1 Initiatives to increase female participation

In addition to putting in place a workplace environment that provides flexible workstyles and continuous employment, we have continued to pursue initiatives that encourage employees to understand Takuma. As a result, the number of female employees on the main career track and in management positions (including individuals who have been tentatively offered positions) as of March 31, 2022, increased to 35, which is three times the corresponding number as of March 31, 2016.

We are working to strengthen these initiatives over five years starting in FY2021 in an effort to increase the number of female employees on the main career track and in management positions by a factor of at least two over corresponding numbers for the most recent five-year period (to 35 or more employees). During FY2021, we added 10 female employees on the main career track through hiring and job group changeover. In addition, during FY2021, we cooperated with efforts to support female students' job-search activities by participating in a Hyogo Prefecture program designed to encourage female students studying in the prefecture to look for jobs within the prefecture.

2 Initiatives to increase hiring of disabled individuals

In addition to hiring people with disabilities to work primarily in general work in various departments and creating the Office Support Section in the Human Resources Department to manage work by people with disabilities and "outsource" internal tasks to them as part of an effort to promote more broadly-based hiring, we currently* employ seven workers with disabilities who clean offices, perform administrative work, and help maintain and manage a cafe space that serves as an employee social welfare facility. (*As of April 30, 2022)

Improving employee satisfaction

1 Programs to ensure employees can continue working over the long-term with peace of mind

We have introduced the following programs to facilitate healthy work-life balance and to help employees make the most of their skills and abilities while balancing their work with child-raising and nursing-care responsibilities. In addition, we are working to increase utilization of parenting support programs to at least 25%, which would double the FY2020 level, by further enhancing those programs and spreading awareness of them. During FY2021, utilization increased to 32%.

- Half-day annual paid leave program
- Childcare leave program
- Nursing-care leave program
- Flex time program
- Telework program
- Staggered working hours program
- Leave program for husbands whose wives are giving birth
- Shortened working hours program

Impressions from an employee who has taken advantage of Takuma's childcare leave program

When I learned my wife was pregnant, I was filled with joy at the prospect of welcoming a new family member. At the same time, I was worried about asking my wife to care for our new child by herself, since there's nobody nearby we can depend on for help after the birth. Those concerns were eased when I was able to use the childcare leave program, thanks to the understanding and cooperation of my workplace colleagues and supervisor. Since I was able to help out with childcare and household chores, despite not being very familiar with either, my wife was happy, and I was able to watch our child's rapid growth from an up-close vantage point. (From a male engineering employee in his 30s)

2 Initiatives to support career development

We have established the following programs to support the development of employees' careers.

- Supervisors schedule two interviews with each subordinate every year to review progress toward operational goals and listen to their wishes and advice directly.
- A self-reporting program session is held every three years to facilitate long-term career development.
- A work group transfer program facilitates movement from clerical and labor positions to the main career track.

We have also introduced programs that give talented employees promotions without regard to whether they were a new or mid-career hire.

Ensuring Safety and Health

The Takuma Group will work to further strengthen its core strengths of technology and expertise as well as relationships of trust with customers while preventing a decline in the quality of its products and services or in the level of trust it enjoys from society by safeguarding workers' physical and mental health and building an environment in which it is easy for employees to do their jobs. Specifically, we will accomplish these goals by ensuring occupational safety and health, managing employee health, and putting in place an employee-friendly workplace environment.

Occupational safety and health initiatives

Since FY2006, we have introduced TK-COHSMS based on an occupational safety and health management system for the construction industry and worked actively and independently to improve our safety and health activities. We believe that among these efforts, the manner in which (1) safety inspections, (2) mandatory safety and health education (education for construction site representatives), and (3) creation of pre-work safety procedure checklists known as SSAs have been steadily adopted by all departments and used to consistently improve the level of knowledge about Takuma's safety and health is particularly noteworthy.

We have adopted the following safety and health objectives for FY2021: eliminating fatal accidents and accidents that result in work stoppages (of four or more days); pursuing a thorough program of safety and health education, ensuring adherence to safety inspection guidelines, and implementing the branch safety patrol plan; strengthening collaboration with the Safety and Health Cooperative Association. Takuma and involved contractors worked together to revitalize safety and health activities companywide by reliably fulfilling their respective roles.

We have adopted the following safety and health objectives for FY2022: eliminating rule violations by activating safety and health education, establishing measures to reduce risks, rolling out new safety patrols with the goal of reducing accidents, and sharing robust safety awareness while strengthening cooperative structures with the Safety and Health Cooperative Association. Rather than contenting ourselves with the status quo, we will pursue new safety and health initiatives to foster a strong awareness of the concept that underlies our safety and health policy—"understanding the need for respecting people and giving top priority to safety and health"—on the part of everyone who is involved in our operations.

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 safety and health manager or other responsible official in each department conducts a successful safety inspection based on safety and health plans for the construction or installation work as prepared by our primary partner companies.

We strive to ensure a safe work environment at all construction sites by eliminating risk factors identified by those inspections before work begins.

●Number of safety inspections completed in FY2021: 106

A safety inspection meeting

2 Safety patrols and safety lectures

Based on an annual plan, safety patrols are carried out at worksites by the Safety and Health Committee (comprised of committee members and advisors), Safety Control Department, and Construction Division along with safety lectures in a precisely targeted and efficient manner.

Safety patrols focus on identifying and eliminating risks as early as possible, while safety lectures are conceived to prevent occupational accidents and raise employees' safety awareness by offering an opportunity to hand out and explain materials such as examples of accidents. Both programs help ensure safety at worksites in the field.

●Number of safety patrols implemented in FY2021
- By Safety and Health Committee (members, advisors) ····· 60
- By Safety Control Department ····· 269
- By Construction Division ····· 260

Safety patrols

3 Safety and health education

1 Education for construction site representatives

We offer specialized safety and health education to employees and supervisors from affiliates so that they can offer precise safety guidance and fulfill their responsibilities as site supervisors.

We are putting in place mechanisms for preventing accidents, including by assigning workers with extensive knowledge in areas such as safety and health-related laws and ordinances thanks to an education program that began on April 1, 2004, to individual construction sites.

●April 2004 to March 2022
- Cumulative number of trainees ····· 37,803
- Number of trainees passing the completion exam ·· 20,134

Head Office venue

Tokyo Branch venue

2 Construction employee education

We offer safety and health education to construction work employees at affiliates so that they can follow safety rules while doing their jobs.

During a lecture

Inspection of safety and protective gear

4 Promoting the digital transformation (DX) in safety and health management

We are promoting a qualitative transformation (DX) as an important technique for reducing accidents while using Information and Communication Technology (ICT) to drive effective techniques for reducing workload, for example through development of information databases, acceleration of information availability, streamlining of communications and enhancement of associated accuracy, and visualization.

Illustration of how site assistance can be provided remotely

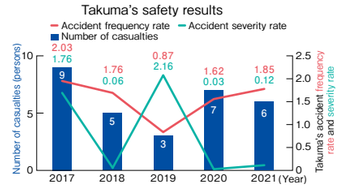
Safety and health awards in the Construction Division / Safety and Health Promotion Meeting

Takuma recognized employees who worked to prevent occupational accidents at worksites and set zero-accident records at an internal award ceremony held on the anniversary of the company's founding. Although we had planned to similarly recognize primary partner companies who helped set zero-accident records at the Safety and Health Promotion Meeting, we were forced, with great regret, to cancel the event along with the awards ceremony again in FY2021 due to the COVID-19 pandemic. However, we were able to recognize award recipients who set zero-accident records by sending them a commemorative award.

Internal presentation of a zero-accident record award

Occurrence of occupational accidents at Takuma in recent years (Number of casualties, accident frequency rate, and accident severity rate)

The total actual working hours for Takuma in 2021 was about 3.23 million hours. Although the number of occupational accidents and accidents resulting in work stoppages fell from 2020, both the accident frequency rate and the accident severity rate rose.



*Accident frequency rate: Indicates the frequency with which accidents occur as the number of fatalities caused by occupational accidents per 1 million actual working hours.

$$\frac{\text{Number of casualties due to occupational accidents}}{\text{Total actual working hours}} \times 1{,}000{,}000$$

Year	Accident frequency rate	Accident severity rate
2017	0.81	0.18
2018	1.09	0.30
2019	1.69	0.29
2020	1.30	0.24
2021	1.39	0.41

Reference: Nationwide average accident frequency and severity rates for the construction industry (general construction)

*Accident severity rate: Indicates the seriousness of accidents as the number of work-days lost per 1,000 actual working hours.

$$\frac{\text{Total work-days lost}}{\text{Total actual working hours}} \times 1{,}000$$

Managing employee health

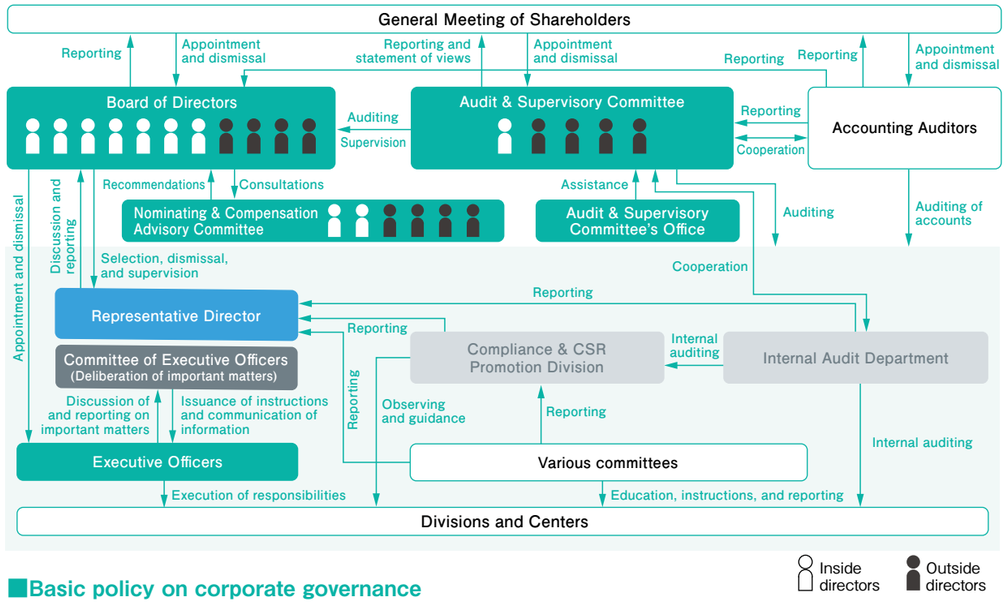
To follow up on employees' regular check-ups, we work with industrial physicians to recommend additional testing and treatments to individual employees and provide health guidance from industrial physicians. Additionally, we are working to assist employees who work excessively long hours, for example by assessing the conditions under which they work, conducting interviews as necessary, and having their supervisors consider possible remedies. Furthermore, we offer assistance to defray the cost of using cafeteria plans as an initiative to increase employee health.

Strengthening Corporate Governance

Corporate governance structures

We have put in place the following governance structures:

(As of June 24, 2022)



Inside directors　Outside directors

Basic policy on corporate governance

In order to safeguard and steadily increase the Group's corporate value over the long-term, it is essential not only to ensure the development of the company's businesses, but also to clearly define governance in corporate operations—that is, to ensure that shareholders' oversight of operations is carried out appropriately and that officers carry out their operational responsibilities by means of a process that is clear, rational, efficient, and legally compliant. For that reason, we believe that understanding the Corporate Governance Code and putting it into practice in an autonomous and systematic manner are top-priority management issues.

Board of Directors

As of June 24, 2022, the Board of Directors was comprised of six directors (excluding directors who are members of the Audit & Supervisory Committee) and five Audit & Supervisory Committee members (of whom four were outside directors). 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 and ordinances, as well as to oversee the execution of the directors' duties.

Directors: 11 (10 men and 1 woman), including 4 outside directors (3 men and 1 woman)

Executive officers

In order to accelerate management decision-making and clarify where management responsibilities are placed, we have adopted an executive officer system in which we appoint executive officers who are entrusted with the responsibility of executing our business activities. As of June 24, 2022, there were 15 executive officers (including those who also serve as directors). Moreover, we have also established a Committee of Executive Officers, which is chaired by the president/chief executive 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.

Audit & Supervisory Committee

We have established an Audit & Supervisory Committee to serve as our auditing structure. That committee, which consists of five members, of whom four are outside directors, is responsible for accounting and operational audits. Members of the committee attend important meetings, including those of the Board of Directors and the Committee of Executive Officers, and they strive to understand and observe the status of business execution in a timely and appropriate manner. They express their opinions as necessary, administer self-inspections and evaluations by all executive officers of the internal control system at year-end, and otherwise conduct strict auditing of the business execution performed by the directors. In addition, members work together to conduct audits of worksites, departments, and subsidiaries in accordance with audit policies and other guidelines established by the Audit & Supervisory Committee while exchanging information regularly, for example by receiving reports from accounting auditors and the Internal Audit Department about topics such as audit plans and the status of ongoing audits. Members also receive business reports as necessary from subsidiaries as they work to communicate and exchange information with those companies' directors, Audit & Supervisory Board members, and other personnel.

Audit & Supervisory Committee's Office

Takuma has put in place structures to ensure Audit & Supervisory Committee members can do their jobs effectively by establishing an Audit & Supervisory Committee's Office to help carry out the committee's work.

Nominating & Compensation Advisory Committee

We have established the Nominating & Compensation Advisory Committee to increase transparency and objectivity in the selection of candidates for director and executive officer positions and in the determination of the compensation and other terms so as to enhance the oversight function of the Board of Directors. The Committee includes a total of six members, the majority of whom are independent outside directors: four independent officers (independent outside directors), a representative director, and the executive officer in charge of human resources. The Nominating & Compensation Advisory Committee, which reports to the Board of Directors, discusses topics related to executive appointment, dismissal, and compensation as well as topics related to CEO succession planning. Having received that report, the Board of Directors makes final decisions on related matters after sufficient discussion while respecting the Committee's report.

Appointment and dismissal criteria for directors

1 Policy on the appointment and dismissal of executives

To maintain an appropriate number of members who can conduct effective discussions and assure that the body can appropriately carry out its role of decision-making on basic policies and important matters related to the company's management and supervision of directors' and executive officers' execution of their job responsibilities, Takuma takes various steps to ensure that the Board of Directors' membership exhibits a good balance of knowledge, experience, and ability. The Policy on the Appointment and Dismissal of Executives put in place by the Board of Directors establishes appropriate processes for appointing and dismissing executives along with basic requirements for director candidates and executive officers; criteria for appointing director candidates, executive officers, and other positions; and criteria for dismissing directors and executive officers.

2 Procedures for appointing and dismissing executives

The Nominating & Compensation Advisory Committee, whose membership consists of independent officers, representative directors, and the officer in charge of human resources (with a majority of independent outside directors), discusses the appointment and dismissal of directors and executive officers, including the position of president and CEO, in accordance with the Policy on the Appointment and Dismissal of Executives put in place by the Board of Directors. The Board of Directors makes final decisions in such matters after sufficient discussion based on factors including directors' past and present performance of their responsibilities while respecting reports and advice from the Committee.

Selection criteria for independent officers

Takuma designates all outside officers who satisfy certain qualifications as independent officers.

We assess the independence of outside directors based on standards of independence adopted by the Tokyo Stock Exchange as well as our own internal Standards for Determining the Independence of Outside Executives.

Standards for Determining the Independence of Outside Executives

In Takuma's view, the following individuals do not exhibit sufficient independence to qualify as an independent executive:

(1) Individuals/entities whose principal business partner is Takuma*1 and their officers*2

(2) Principal business partners of Takuma*3 and their officers

(3) Consultants, accounting experts, and legal experts who are receiving financial compensation or other assets in excess of a certain amount*4 from Takuma, apart from executive compensation (If the entity receiving such assets is an organization such as a corporation or an association, then this criterion refers to individuals belonging to that organization.)

(4) Individuals/entities that receive donations or aid in excess of a certain amount*4 from Takuma, apart from executive compensation (If the entity receiving such assets is an organization such as a corporation or an association, then this criterion refers to individuals belonging to that organization.)

(5) Major shareholders*5 of Takuma and their officers

*1: "Individuals/entities whose principal business partner is Takuma" refers to individuals and entities that earned at least 2% of their consolidated net sales during the most recent business year from Takuma.
*2: "Officers" refers to managing directors, executive officers, and other personnel.
*3: "Principal business partners of Takuma" refers to individuals and entities whose payments to Takuma constituted at least 2% of Takuma's consolidated net sales during the most recent business year.
*4: "A certain amount" refers to at least JPY 10 million (for individuals) or at least 2% of gross sales (for organizations) during the most recent business year.
*5: "Major shareholder" refers to an individual or entity that holds at least 10% of the total voting rights.

Compensation and other remuneration paid to directors (except Audit & Supervisory Committee members)

1 Matters relating to the General Meeting of Shareholders' resolution concerning director compensation and other remuneration

Meeting on June 28, 2016, the 112th Annual General Meeting of Shareholders resolved to limit compensation and other remuneration paid to directors (except Audit & Supervisory Committee members) to JPY 350 million per year. When the Annual General Meeting of Shareholders in question ended, there were six directors (not counting Audit & Supervisory Committee members).

Meeting on June 26, 2019, the 115th Annual General Meeting of Shareholders resolved to pay monetary compensation rights not greater than JPY 90 million per year to directors (except Audit & Supervisory Committee members) for use in acquiring restricted stock, separate from the above compensation limit. (The resolution limited the total number of shares of Takuma common stock issued or disposed for this purpose to 120,000 shares per year.) When the Annual General Meeting of Shareholders in question ended, there were six directors (not counting Audit & Supervisory Committee members).

Meeting on June 28, 2016, the 112th Annual General Meeting of Shareholders resolved to limit compensation and remuneration paid to directors who are members of the Audit & Supervisory Committee to JPY 72 million per year. When the Annual General Meeting of Shareholders in question ended, there were four directors that were members of the Audit & Supervisory Committee.

2 Method for formulating policies for determining of compensation and other remuneration

Takuma's Policy on Executive Compensation and Other Remuneration, which was established by resolution of the Board of Directors, codifies Takuma's policies for determining compensation and other remuneration for directors (except Audit & Supervisory Committee members). The policy is revised as necessary by resolution of the Board of Directors following consultation with, and consideration of recommendations submitted by, the Nominating & Compensation Advisory Committee.

3 Policies for determining of compensation

Takuma has adopted the following basic policies concerning the determination of compensation under the "Policy on Executive Compensation and Other Remuneration" adopted by the Board of Directors:

- Compensation should be suited to the role and responsibilities of the director in question, and it should help the company secure talented human resources.
- The compensation system should reflect appropriate consideration of the need to motivate directors to increase fiscal year performance as well as corporate value over the medium- and long-term.
- The process used to determine compensation should exhibit transparency and objectivity so that the company can fulfill its obligation of accountability to shareholders and other stakeholders.

Compensation system

Compensation for directors and executive officers consists of fixed compensation, bonuses paid according to fiscal year performance, and stock compensation (compensation in the form of restricted stock), which is used to motivate recipients to increase medium- and long-term corporate value.

Fixed compensation	Fixed compensation is set depending on the role and responsibilities of each position and paid on a monthly basis.
Bonuses	Takuma has adopted a set of standards for calculating bonuses based on indicators such as fiscal year performance and achievement of targets, and the Board of Directors determines whether to pay bonuses and, if so, in what amount using those standards as a guide. Bonuses are paid at predetermined times each year. As a general rule, bonuses are capped at a maximum of 25% of fixed salary (annual amount).
Stock compensation	Stock compensation takes the form of shares of restricted stock that are granted in advance. Monetary compensation rights set depending on the role and responsibilities of each position are allocated at predetermined times each year, and shares in Takuma are granted in exchange for the pay-in of those rights. As a general rule, stock compensation is capped at a maximum of 30% of fixed salary (annual amount), with the percentage increasing with seniority of position.

Compensation for outside directors and directors who are Audit & Supervisory Committee members consists of fixed compensation only.

Procedure for determining compensation

The Nominating & Compensation Advisory Committee, whose membership consists of independent officers, representative directors, and the officer in charge of human resources (with a majority of independent outside directors), discusses matters related to compensation and remuneration programs, the amount or calculation standard for each director's compensation and other remuneration, and other executive officers' compensation and other remuneration in accordance with the Policy on Executive Compensation and Other Remuneration and reports the results to the Board of Directors. Having received that report, the Board of Directors makes final decisions on related matters after sufficient discussion while respecting the Committee's report.

In determining the amounts of individual compensation packages, the suitability of those packages is verified based on factors including the Group's performance, compensation levels for executives at other companies, and employee salary levels.

Compensation for directors who are Audit & Supervisory Committee members and related issues are determined through discussion of directors who are Audit & Supervisory Committee members, within the scope set forth by the General Meeting of Shareholders.

Matters related to performance-linked compensation

Because the Group's business operates primarily on a build-to-order basis and because it considers consolidated ordinary profit to be the most important management indicator, consolidated order value and consolidated ordinary profit serve as key performance indicators in calculating bonuses that are based on fiscal year performance.

Specifically, a calculation table is used to calculate a coefficient based on the consolidated ordinary profit for the business year in question, the rate of growth relative to the average consolidated ordinary profit for the most recent three years, the extent to which the consolidated ordinary profit target has been achieved, and the extent to which the consolidated order value target has been achieved. Bonus amounts are then determined based on this coefficient. (Consolidated ordinary profit performance figures are calculated before deducting executive bonuses at companies included in consolidated accounting.) Performance forecasts included in the financial briefing announced every May are used as target values in the evaluation.

Non-monetary compensation and remuneration

Takuma offers directors stock compensation in the form of shares of restricted stock as a medium- and long-term incentive and as a means of sharing shareholder value. Transfer is restricted for a period of 30 years from the date on which the allocation of Takuma common stock is made, and the restriction is removed when that period ends or if the individual in question passes away, completes his or her term, retires, or otherwise ends his or her involvement with the company before the period ends for a legitimate reason approved in advance by the Board of Directors.

Total amounts of compensation and other remuneration for directors

Executive category	Total compensation and other remuneration (millions of yen)	Total compensation and other remuneration by type (millions of yen)			Number of executives included
		Basic compensation	Performance-linked compensation and other remuneration	Non-monetary compensation and other remuneration	
Director (except Audit & Supervisory Committee member)	260	183	36	40	8
Director (Audit & Supervisory Committee member) (outside director)	56 (35)	56 (35)	–	–	6 (4)

*Performance-linked compensation and other remuneration consists of bonuses awarded to directors (except Audit & Supervisory Committee members).
*Non-monetary compensation and other remuneration consists of shares of restricted stock granted to directors (except Audit & Supervisory Committee members).

Evaluation of the effectiveness of the Board of Directors

In order to increase the effectiveness of the Board of Directors, all directors participate in a questionnaire and interviews about the body's effectiveness. Those results are then analyzed, evaluated, reported to the Board by the executive in charge of the evaluation process, and discussed by the Board.

In the FY2021 evaluation, the effectiveness of the Board of Directors was analyzed and evaluated from four perspectives: the body's composition, its operation, the responsibilities of its members, and its overall effectiveness. This evaluation found that the Board had operated in an effective and efficient manner and that it was implementing ongoing initiatives to improve its functionality and ensure its effectiveness, for example by increasing the frequency of reports related to exchanges of information with investors as part of Takuma's IR activities and placing discussions on strategic themes from a medium- and long-term perspective and progress reports on the agenda for Board meetings.

Going forward, we will continue to work to improve the effectiveness of the Board of Directors, for example by reviewing topics of discussion as appropriate, with a focus on the general direction of corporate strategy.

Internal controls

Takuma has adopted a Basic Policy for Establishment of an Internal Control System in accordance with the Companies Act. 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.

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

In this way, we will continue to work in the future to ensure thorough compliance while carrying out business properly and efficiently while also deepening risk management.

Governance: Governance Initiatives

Executive Profiles (As of June 24, 2022)

Directors

President and Representative Director & Chief Executive Officer

Hiroaki Nanjo

April 1982 Joined the Company
April 2009 General Manager of Environmental Engineering Department 1, Project Center, Engineering Group
September 2010 General Manager of Energy Engineering Department 1, Project Center, Engineering Group
April 2013 Executive Officer of the Company
Deputy Executive Manager of Project Center, Engineering Group and General Manager of Energy Engineering Department 1
April 2014 Executive Manager of Project Center, Engineering Group
June 2015 Director & Executive Officer of the Company
April 2016 Director & Managing Executive Officer of the Company
Executive Manager of Engineering Group and Executive Manager of Management Center
April 2018 Director & Senior Managing Executive Officer
April 2019 President and Representative Director & Chief Executive Officer (up to the present)

Mr. Hiroaki Nanjo has mainly been engaged in the Planning Technology Division, and currently supervises the overall management as Chief Executive Officer, after serving as a Director & Senior Managing Executive Officer and Executive Manager of the Engineering Group. He possesses abundant experience and knowledge regarding operations and management of the Company.

Director & Senior Managing Executive Officer

Tsuyohito Nishiyama

April 1985 Joined the Company
April 2012 General Manager of Project Administration Department 1, Business Administration Division, Corporate Marketing Group
April 2014 General Manager of Corporate Planning Department, Corporate Planning & Administration Division
April 2015 Executive Officer of the Company
Deputy Executive Manager of Corporate Planning & Administration Division and General Manager of Corporate Planning Department
April 2016 Executive Manager of Corporate Planning & Administration Division
June 2016 Director & Executive Officer of the Company
April 2018 Director & Managing Executive Officer of the Company
April 2019 Director & Senior Managing Executive Officer (up to the present)
Executive Manager of Corporate Marketing Group and Executive Manager of Business Administration Division (up to the present)

Mr. Tsuyohito Nishiyama has mainly been engaged in the Business Administration Division, the Marketing Division and the Corporate Planning & Administration Division, and currently serves as a Senior Managing Executive Officer and Executive Manager of Corporate Marketing Group that supervises overall marketing. He possesses abundant experience and knowledge regarding operations and management of the Company.

Director & Senior Managing Executive Officer

Hideki Takeguchi

April 1985 Joined the Company
April 2012 Deputy General Manager of Environmental Engineering Department 1, Project Center, Engineering Group
April 2014 General Manager of Environmental Engineering Department 1, Project Center, Engineering Group
April 2015 Executive Officer of the Company
Deputy Executive Manager of Project Center, Engineering Group and General Manager of Environmental Engineering Department 1
April 2016 Executive Manager of Project Center, Engineering Group
June 2016 Director & Executive Officer of the Company
April 2018 Director & Managing Executive Officer of the Company
April 2019 Director & Senior Managing Executive Officer (up to the present)
Executive Manager of Engineering Group and Executive Manager of Management Center (up to the present)

Mr. Hideki Takeguchi has mainly been engaged in the Planning Technology Division, and currently serves as a Director & Senior Managing Executive Officer and Executive Manager of Engineering Group that supervises overall engineering. He possesses abundant experience and knowledge regarding operations and management of the Company.

Director & Managing Executive Officer

Koji Tanaka

April 1986 Joined the Company
April 2009 Deputy General Manager of European Operations Department, Corporate Planning & Administration Division
August 2011 General Manager of Corporate Planning Department, Corporate Planning & Administration Division
April 2014 General Manager of Human Resources Department, Corporate Services Division
April 2017 Executive Officer of the Company
Executive Manager of Compliance & CSR Promotion Division, Executive Manager of Corporate Services Division and General Manager of Legal Affairs Department
June 2017 Director & Executive Officer of the Company
April 2018 Executive Manager of Compliance & CSR Promotion Division and Executive Manager of Corporate Services Division
April 2021 Director & Managing Executive Officer (up to the present)
Executive Manager of Corporate Marketing Group and International Division and Executive Manager of Compliance & CSR Promotion Division
June 2021 Executive Manager of Corporate Marketing Group and International Division (up to the present)

Mr. Koji Tanaka has mainly been engaged in the Information Systems Division, neutral divisions such as human resources, Corporate Planning & Administration Division and the International Division, and currently serves as Managing Executive Officer and Executive Manager of the Corporate Marketing Group and International Division, which is responsible for the Company's overseas business. He possesses abundant experience and a wide range of knowledge regarding operations and management of the Company.

Director & Managing Executive Officer

Kunio Hamada

July 1990 Joined the Company
April 2012 Deputy General Manager of Cost Control & Project Administration Department, Management Center, Engineering Group
June 2013 General Manager of Cost Control & Project Administration Department, Management Center, Engineering Group
April 2018 Executive Officer of the Company
Deputy Executive Manager of Corporate Planning & Administration Division and General Manager of Corporate Planning Department
April 2021 Executive Manager of Corporate Planning & Administration Division (up to the present)
June 2021 Director & Executive Officer of the Company
April 2022 Director & Managing Executive Officer (up to the present)

Mr. Kunio Hamada has mainly been engaged in the engineering division and cost management division, and currently serves as Managing Executive Officer and Executive Manager of Corporate Planning & Administration Division responsible for finance and formulation and implementation of corporate plans. He possesses abundant experience and a wide range of knowledge regarding operations and management of the Company.

Director & Executive Officer

Hiroshi Oishi

April 1988 Joined The Dai-Ichi Kangyo Bank, Ltd. (currently Mizuho Bank, Ltd.)
January 2008 Deputy General Manager of Human Resources Department, Mizuho Securities Co., Ltd.
January 2013 Deputy General Manager of Corporate Planning Department
April 2013 General Manager of Securities & Trust Promotion Department, Mizuho Bank, Ltd.
April 2016 General Manager of Customer Service Department and General Manager of Management Department, Mizuho Financial Group, Inc.
August 2019 Executive Officer of the Company
Deputy Executive Manager of Energy Plant Division, Corporate Marketing Group
April 2021 Executive Manager of Corporate Services Division (up to the present)
June 2021 Director & Executive Officer of the Company (up to the present)

Since joining The Dai-Ichi Kangyo Bank, Ltd. (currently Mizuho Bank, Ltd.), Mr. Hiroshi Oishi engaged in various operations at the bank and its group companies including deposits, money transfers, loans, currency exchange, business planning, human resources and customer service. At the Company, he has engaged in product and service sales in the marketing division, and currently serves as Executive Officer and Executive Manager of Corporate Services Division responsible for general affairs and human resources. He possesses abundant experience and a wide range of knowledge regarding operations and management of the Company.

Director (Standing Audit & Supervisory Committee Member)

Keizo Masugi

January 2001 Joined the Company
April 2014 General Manager of Accounting Department, Corporate Planning & Administration Division
April 2016 General Manager of Corporate Planning Department, Corporate Planning & Administration Division
April 2018 General Manager of General Affairs Department and General Manager of Legal Affairs Department, Corporate Services Division
April 2021 Assistant General Manager of Audit & Supervisory Committee's Office
June 2021 Director (Standing Audit & Supervisory Committee Member) of the Company (up to the present)

Mr. Keizo Masugi has mainly been engaged in the accounting department and Corporate Planning & Administration Division, and served as General Manager of General Affairs Department and Legal Affairs Department handling shareholder response and other general affairs duties and as well as preventive legal work and other legal affairs. He currently serves as a Standing Audit & Supervisory Committee Member. He possesses abundant experience and a wide range of knowledge regarding operations and management of the Company.

Outside Director (Audit & Supervisory Committee Member)

Tomomi Fujita

October 2004 Registered as Attorney at Law (Osaka Bar Association)
Joined Kitahama Partners
January 2012 Partner of Kitahama Partners
March 2016 Left Kitahama Partners
April 2016 Founded Innoventier
Partner of Innoventier (up to the present)
February 2017 Director, Licensing Executive Society Japan
April 2018 Assistant Lecturer, Kyoto University Law School (up to the present)
June 2019 Director (Audit & Supervisory Committee Member) of the Company (up to the present)
June 2019 Outside Auditor of TAIYO YUDEN CO., LTD. (up to the present)
February 2020 Vice President of Licensing Executives Society Japan (up to the present)

Ms. Tomomi Fujita is involved in management of law firm Innoventier as Partner while serving as Vice President of the Licensing Executive Society Japan and Assistant Lecturer of Kyoto University Law School. She possesses abundant experience and expertise regarding corporate law covering intellectual property, business revitalization, M&As, and the Companies Act. In addition to serving as Outside Director who is an Audit & Supervisory Committee Member of the Company, she serves as an Outside Auditor for a listed company.

Outside Director (Audit & Supervisory Committee Member)

Tetsuya Kaneko

April 1981 Joined The Dai-Ichi Kangyo Bank, Ltd. (currently Mizuho Bank, Ltd.)
September 2000 Deputy General Manager of Singapore Branch, The Dai-Ichi Kangyo Bank, Ltd.
April 2002 Deputy General Manager of Singapore Branch, Mizuho Corporate Bank, Ltd. (currently Mizuho Bank, Ltd.)
November 2004 Associate Director of International Administration Department, Mizuho Corporate Bank, Ltd.
April 2005 General Manager of Yokohama Sales Department, Mizuho Corporate Bank, Ltd.
April 2008 General Manager of International Sales Promotion Department, Mizuho Corporate Bank, Ltd.
April 2010 Deputy Director of Human Resources Management Department, Mizuho Corporate Bank, Ltd.
July 2010 Deputy Director of Corporate Planning Department, Mizuho Financial Group, Inc.
July 2010 Senior Executive Officer; General Manager of Education Business Department, Mizuho Research Institute Ltd. (seconded)
November 2010 Senior Executive Officer; General Manager of Education Business Department, Mizuho Research Institute Ltd.
May 2011 Left Mizuho Research Institute Ltd.
June 2011 Director of KANEMATSU CORPORATION
June 2014 Managing Executive Officer of KANEMATSU CORPORATION
June 2019 Resigned from KANEMATSU CORPORATION
Standing Auditor, Yushu Building Co., Ltd. (currently Yushu Corporation)
June 2020 Director (Audit & Supervisory Committee Member) of the Company (up to the present)
Representative Director and President, Yushu Corporation (up to the present)

Mr. Tetsuya Kaneko has served as Director and Managing Executive Officer at the global company KANEMATSU CORPORATION, for many years. He possesses abundant experience and knowledge on corporate management, and he has served as an Audit & Supervisory Board member and Audit & Supervisory Committee member at a number of private-sector companies, including Takuma. In addition to having extensive experience and knowledge in the areas of auditing and supervision, he gained extensive knowledge on overseas business from his abundant experience working overseas while he was serving at The Dai-Ichi Kangyo Bank, Ltd. (currently Mizuho Bank, Ltd.).

Outside Director (Audit & Supervisory Committee Member)

Seiichi Nagatsuka

April 1980 Joined the Ministry of International Trade and Industry (currently the Ministry of Economy, Trade and Industry)
September 1984 Studied at graduate school of Economics, Brown University, U.S.A. (where he earned a master's degree)
May 1994 Director of Trade Research Office, Trade Policy Bureau, the Ministry of International Trade and Industry (currently the Ministry of Economy, Trade and Industry)
May 1995 Ministry of Foreign Affairs (seconded)
Counselor of the Permanent Mission of Japan to the International Organizations in Geneva (with responsibility for the WTO)
June 1998 Director of Trade Research Division, Trade Bureau, the Ministry of Economy, Trade and Industry
June 1999 Deputy Director of Commerce, Industry, and Labour Department, Miyazaki Prefectural Government (seconded)
January 2001 Director of Macro Economic Affairs Division, Economic and Industrial Policy Bureau, the Ministry of Economy, Trade and Industry
July 2003 Director of Automobile Division, Manufacturing Industries Bureau, Automobile Division, the Ministry of Economy, Trade and Industry
September 2005 Deputy Director-General for Trade Policy, Trade Policy Bureau, the Ministry of Economy, Trade and Industry
October 2007 Senior Vice President of the Japan International Cooperation Agency (JICA)
August 2009 Deputy Director-General of Manufacturing Industries Bureau, the Ministry of Economy, Trade and Industry
July 2010 Director-General, Kansai Bureau of Economy, Trade and Industry, the Ministry of Economy, Trade and Industry
August 2011 Director-General, Commerce and Information Policy Bureau, the Ministry of Economy, Trade and Industry
June 2013 Retired from the Ministry of Economy, Trade and Industry
October 2013 Advisor to Mitsui Sumitomo Insurance Co., Ltd.
May 2014 Vice Chairman and Senior Managing Director of Japan Automobile Manufacturers Association, Inc. (up to the present)
June 2022 Director (Audit & Supervisory Committee Member) of the Company (up to the present)

Mr. Seiichi Nagatsuka has held numerous important posts since he joined the Ministry of International Trade and Industry (currently the Ministry of Economy, Trade and Industry), and with experience serving at the Permanent Mission of Japan to the International Organizations in Geneva and the Japan International Cooperation Agency (JICA), he is well versed in overseas business. Mr. Nagatsuka, who currently serves as Vice Chairman and Senior Managing Director at the Japan Automobile Manufacturers Association, Inc., also has extensive experience and knowledge in the areas of industrial policy and trade policy.

Outside Director (Audit & Supervisory Committee Member)

Masahiro Endo

October 1985 Joined Nisshin Audit Corporation (currently Ernst & Young ShinNihon LLC)
March 1989 Registered as a certified public accountant
May 1989 Registered as a licensed tax accountant
August 1997 Partner, Century Audit Corporation (currently Ernst & Young ShinNihon LLC)
June 2007 Left Century Audit Corporation
July 2007 Representative, Endo Certified Public Accountant Office (up to the present)
June 2015 Outside Auditor, Sakurajima Futo Kaisha, Ltd. (up to the present)
December 2020 Representative Director, Kobe Audit Corporation (up to the present)
June 2022 Director (Audit & Supervisory Committee Member) of the Company (up to the present)

After participating in the auditing of publicly listed companies as a certified public account for many years at what is now Ernst & Young ShinNihon LLC, where he later became a partner, Mr. Masahiro Endo became the representative of Endo Certified Public Accountant Office in July 2007. In December 2020, he founded Kobe Audit Corporation, where he serves as the representative director, and he possesses abundant experience and expert knowledge on finance and accounting as well as abundant experience and knowledge on audit and supervision, including experience serving as an outside Audit & Supervisory Board member at publicly listed companies.

Governance: Governance Initiatives

Directors' skills matrix

Name	Position at Takuma	Number of years serving as a director (as of June 24, 2022)	Skill sets necessary for the Board of Directors of the Company							Attendance at Board of Directors meetings during FY2021	Attendance at Audit & Supervisory Committee meetings during FY2021
			Corporate management	Engineering (technology, quality, and cost management)	Sales and business strategies	International operations	Finance and accounting	Human resources, talent development, and diversity	Legal affairs, compliance, and risk management		
Hiroaki Nanjo	President & Representative Director	7	●	●	●	●		●		16 of 16 (100%)	-
Tsuyohito Nishiyama	Director & Senior Managing Executive Officer	6	●		●		●			16 of 16 (100%)	-
Hideki Takeguchi	Director & Senior Managing Executive Officer	6	●	●		●				16 of 16 (100%)	-
Koji Tanaka	Director & Managing Executive Officer	5	●		●	●		●	●	16 of 16 (100%)	-
Kunio Hamada	Director & Managing Executive Officer	1	●	●			●			12 of 12 (100%)	-
Hiroshi Oishi	Director & Executive Officer	1						●	●	12 of 12 (100%)	-
Keizo Masugi	Director (Audit & Supervisory Committee Member)	1					●		●	12 of 12 (100%)	10 of 10 (100%)
Tomomi Fujita	Outside Director (Audit & Supervisory Committee Member)	3	●						●	15 of 16 (94%)	11 of 12 (92%)
Tetsuya Kaneko	Outside Director (Audit & Supervisory Committee Member)	2	●			●				16 of 16 (100%)	12 of 12 (100%)
Seiichi Nagatsuka	Outside Director (Audit & Supervisory Committee Member)	Newly appointed			●	●				Newly appointed	Newly appointed
Masahiro Endo	Outside Director (Audit & Supervisory Committee Member)	Newly appointed					●			Newly appointed	Newly appointed

*The above chart does not include all knowledge and experience brought to Takuma by its directors.

Executive officers (excluding those who also serve as directors)

Managing Executive Officer
Executive Manager,
Engineering Center
Norito Uchiyama

Managing Executive Officer
Executive Manager,
Energy Plant Division
Mitsuaki Adachi

Managing Executive Officer
Executive Manager,
Technology Center
Akira Taguchi

Managing Executive Officer
Executive Manager,
Environmental Plant Division
Hidetoshi Tomita

Managing Executive Officer
Executive Manager,
Project Center
Norio Maeda

Executive Officer
Executive Manager,
Construction Center
Keiji Nakamura

Executive Officer
Executive Manager,
Compliance & CSR Promotion Division
Yasushi Enomoto

Executive Officer
Deputy Executive Manager,
Engineering Center
Kiyoshi Shibata

Executive Officer
Deputy Executive Manager,
Energy Plant Division
Masayuki Sugita

Message from the newly appointed outside directors

I feel deeply honored to have been appointed to serve as an outside director at Takuma.

While working as a public servant for more than 32 years at the Ministry of Economy, Trade and Industry, I gained a range of governmental experience, including being seconded to an overseas diplomatic mission, local government agency, and independent administrative agency. After retiring from the Ministry, I was involved with programs designed to facilitate the development of the automotive industry while serving for about eight years as a representative director of a general incorporated association. I look forward to drawing on my experience in the public sector and on my knowledge of corporate support to contribute to Takuma's development.

Japanese industry is being called upon to respond quickly to a dramatic transformation accompanying changes in the structure of society, including carbon neutrality and the digital transformation. At the same time, globalization makes it necessary to practice sophisticated risk management to address the immediate manifestation of business risk posed by overseas events, including the spreading COVID-19 pandemic and the crisis in Ukraine. One might say that the business environment in which companies operate is rapidly becoming more challenging.

Takuma has led with meaningful businesses, for example by supplying infrastructure that plays an essential role in addressing environmental and energy issues, while leveraging technologies developed over many years in keeping with its founding spirit of contributing to society through boilers. In the future, I believe that increasing its corporate value in a sustained manner as a leading company by practicing ESG management in accordance with the Vision 2030 long-term vision is both Takuma's role in society and the fulfillment of stakeholders' expectations.

I look forward to doing my best to ensure I understand Takuma's businesses and to cooperate with other outside directors to contribute to the company's development.

Seiichi Nagatsuka
Outside Director (Audit & Supervisory Committee Member)

I am Masahiro Endo, and I am a certified public accountant who now serves as an outside director and member of the Audit & Supervisory Committee. After being approached to serve in this position, I reviewed publicly available materials (financial statements, timely disclosures, etc.) to learn Takuma's stance on governance and compliance. I was able to affirm that the company's governance structures are appropriate for a company listed in the Prime Market, allowing me to accept the appointment with peace of mind. In addition, Takuma technologies in areas such as waste and water treatment align closely with the SDGs with which society is grappling, and I believe that the sustained growth of Takuma itself embodies a contribution to society. As a result, I have high expectations for the company's future.

As for what the company expects of me, the Audit & Supervisory Committee is a group effort, so the body must carry out organizational audits in a way that draws on the expertise of each of its members. I understand that in addition to taking advantage of my specialty as a certified public accountant, I will need to update my knowledge as an Audit & Supervisory Committee member.

I believe that the significance of the "outside" in "outside director" lies in helping put in place an environment that supports appropriate risk-taking. I look forward to working to meet the expectations of stakeholders, particularly shareholders, by supervising operations while offering advice and leveraging that outside perspective to judge risks accompanying the company's decision-making, verify the methods by which that risk can be reduced or avoided, and continually ask myself whether risk-taking falls within allowable limits.

Masahiro Endo
Outside Director (Audit & Supervisory Committee Member)

Strengthening risk management

Risk management structure

We consider it necessary to appropriately address risks that could interfere with the group's achievement of its business goals so that we can safeguard and steadily increase our corporate value over the long-term.

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.

Group companies also work to develop and strengthen approaches to risk management through the Takuma Group Coordinating Committee for Compliance & 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 Code.
4. Risk management activities are carried out in line with the Medium-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.

Business Continuity Plan (BCP)

In addition to formulating a "Business Continuity Plan" based on the policies listed to the right to ensure proper and appropriate continuity of business operations in the event of a large-scale disaster, pandemic, or other emergency, Takuma conducts exercises on a regular basis.

1. In addition to implementing disaster-related measures to secure the safety of corporate officers and employees, maintain structures so as to enable continuity of business operations while minimizing damage in an emergency.
2. Strive to respond to customer needs and recover from damage quickly by working closely with suppliers and partner companies to maintain business operations.
3. Earn the trust of numerous stakeholders, including employees, their families, shareholders, and nearby residents, and fulfill social needs by maintaining business operations.

Ensuring compliance

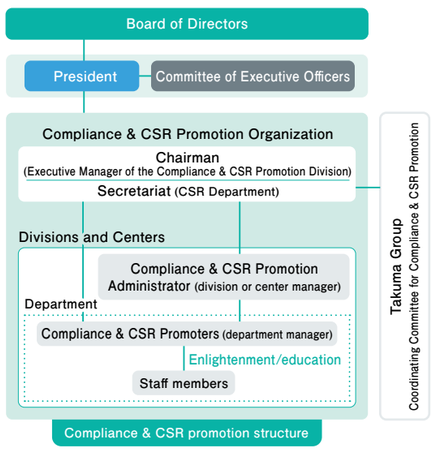
Compliance & CSR promotion structures

Takuma established the Compliance & CSR Promotion Organization to spread awareness of compliance and CSR issues among employees.

This organization is composed of a chairman (the Executive Manager of the Compliance & CSR Promotion Division), a secretariat (positioned in the CSR Department), and an executing organization in each division, center, and department. As the person in charge of promoting compliance and CSR in his or her division or center, each division or center manager is appointed as a Compliance and CSR Promotion Administrator. As persons who implement enlightenment and education in compliance and CSR in their respective departments, department managers are appointed as Compliance and CSR Promoters.

The initiative includes an annual regular meeting at which Compliance & CSR Promotion Administrators discuss the state of compliance and CSR promotion throughout the company as well as quarterly departmental meetings at which Compliance & CSR Promoters are given training to help them better carry out related activities in their departments.

Additionally, we established the Takuma Group Coordinating Committee for Compliance & CSR Promotion, which brings together representatives of group companies to help ensure that compliance and risk management are implemented throughout the group.



Compliance & CSR promotion structure

Fair business practices

Compliance measures

【Initiatives to ensure compliance with the Antimonopoly Act】

Towards ensuring permanent compliance with the Antimonopoly Act, Takuma enacted "Regulations Concerning Management of the Pledge of Antimonopoly Act Compliance", which provides for the submission of a written oath in regard to observing the Antimonopoly Act. When employees interact with the sales department of a competitor, they must apply and receive approval from the affiliated division or center manager in advance to ensure fair business contact.

【Introducing a Legislation Information Service】

Takuma has introduced a Legislation Information Service in order to gain a continuous grasp of the latest changes to laws and ordinances.

【Utilizing the Compliance Manual】

We distribute a Compliance Manual that includes an explanation of the rules and standards of conduct as well as an FAQ to all employees in accordance with Takuma Group Ethics Charter and Takuma Group Code of Conduct. This manual is utilized in the course of daily operations and departmental training.

Compliance & CSR promotion education

Takuma offers compliance and CSR promotion education through the Compliance & CSR Promotion Organization, which was established in order to spread awareness of compliance and CSR issues among employees.

We offered the following four compliance and CSR promotion education sessions during FY2021. In February 2022, we invited an outside expert instructor to give a talk for the fourth session. We also host regular internal CSR lectures for members of the company's executive leadership.

First session:	Preventing Harassment A Reading Aloud of the Compliance Manual
Second session:	Social Media Risk Deepening Our Understanding of ESG
Third session:	Basics of Security Export Controls 2021
Fourth session:	Compliance Training for the Antimonopoly Act (lecture and video)

Number of sessions per year	4	Number of participating departments	49	Total number of attendees	4,660

Fourth educational session

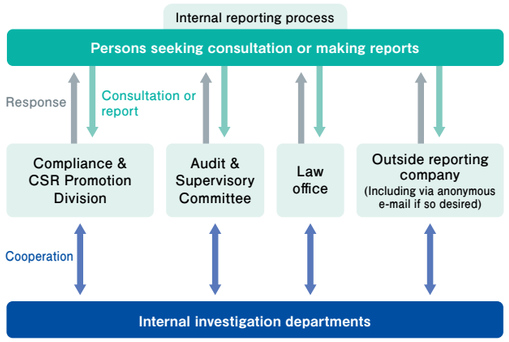
Date	February 09, 2022
Lecture theme	Compliance Training for the Antimonopoly Act: Preventing Bid-rigging and Cartels
Lecturer	Mr. Yuki Takei Attorney at Law, Midosuji Legal Profession Corporation

Internal reporting system

Takuma has been operating an internal reporting system since FY2006, 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 a law office, as well as a dedicated outside reporting company for anonymous e-mail reporting. During FY2020, the Audit & Supervisory Committee was added as an internal contact to further increase the effectiveness of the internal reporting system. Our "Internal Reporting Code" and "Takuma Group Code of Conduct" further declare that no informant shall be subjected to disadvantageous treatment simply because he or she filed a report or cooperated with an investigation.

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



CSR awareness survey

We conduct an annual CSR awareness survey in order to quantitatively assess the level of compliance and CSR awareness along with the effectiveness of related promotional and educational efforts. The results of this survey are used when summarizing the activities of each fiscal year and in formulating the upcoming year's action plan, as well as in future compliance and CSR promotion activities. We make active use of survey results, for example by offering additional education, particularly in areas that received lower scores than in the previous survey.

Section 03

Corporate Information

Financial and Non-financial Data

Financial data (trend in principal management indicators and other financial data)

	Fiscal Year		FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
	End of fiscal year		March 2017	March 2018	March 2019	March 2020	March 2021	March 2022
Business results	Orders received	(Millions of yen)	191,026	177,116	179,829	148,830	188,563	192,244
	Backlog	(Millions of yen)	214,142	273,060	330,939	345,315	387,152	445,304
	Net sales	(Millions of yen)	116,309	118,198	121,950	134,454	146,726	134,092
	Operating profit	(Millions of yen)	10,973	10,029	11,604	9,600	10,473	9,928
	Ratio of operating profit	(%)	9.4	8.5	9.5	7.1	7.1	7.4
	Ordinary profit	(Millions of yen)	11,605	10,669	12,334	10,300	11,028	10,647
	Ratio of ordinary profit	(%)	10.0	9.0	10.1	7.7	7.5	7.9
	Profit attributable to owners of parent	(Millions of yen)	8,550	7,847	8,853	7,445	7,529	7,434
	Comprehensive income	(Millions of yen)	9,936	10,177	7,325	5,881	8,344	7,246
	Return on equity (ROE)	(%)	13.6	10.9	11.1	8.9	8.6	8.1
	Cash flows from operating activities	(Millions of yen)	9,590	5,140	10,817	(11,732)	(1,680)	9,000
	Cash flows from investing activities	(Millions of yen)	142	(328)	(1,382)	(202)	(2,053)	(2,394)
	Cash flows from financing activities	(Millions of yen)	(1,787)	(1,670)	(9,119)	(4,350)	1,903	(9,112)
Financial position	Cash and cash equivalents at end of period	(Millions of yen)	57,132	60,283	61,027	44,753	42,957	41,244
	Net assets	(Millions of yen)	67,727	76,725	83,087	85,040	90,555	94,354
	Total assets*1	(Millions of yen)	140,201	151,488	155,988	163,498	177,741	174,535
	Capital adequacy ratio	(%)	48.1	50.4	53.0	51.8	50.7	53.8
Other	Capital investment	(Millions of yen)	342	505	638	1,564	2,420	3,844
	Depreciation	(Millions of yen)	850	789	797	917	1,036	961
	Research and development expenses	(Millions of yen)	972	928	960	1,154	1,047	1,006
Per-share information	Net assets per share (BPS)	(Yen)	815.77	924.25	1,000.34	1,043.15	1,109.87	1,162.87
	Net income per share (EPS)	(Yen)	103.43	94.93	107.10	90.36	92.73	91.53
	Dividend	(Yen)	13.00	16.00	22.00	31.00	36.00	36.00

Non-financial Data

	Fiscal Year		FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
	End of fiscal year		March 2017	March 2018	March 2019	March 2020	March 2021	March 2022
Social	[Customers]	Customer satisfaction survey (points, non-consolidated)	86.8	85.6	86.3	86.1	88.4	86.5
	[Human resources]	Number of employees (consolidated)	3,447	3,609	3,619	3,816	3,925	4,145
		Number of employees (non-consolidated)	824	837	852	875	894	958
		Number of female employees (non-consolidated)	61	64	68	70	75	81
		Number of female employees in main career track and management positions (non-consolidated)	11	13	14	17	22	31
		Number of new graduates hired (non-consolidated)	18	24	21	20	25	26
		Number of mid-career hires (non-consolidated)	11	10	22	25	37	53
		Average number of annual paid leave days taken (non-consolidated)	6.5	6.7	8.7	8.9	8.6	9.3
		Percent utilization of parenting support programs (%, non-consolidated)	-	-	-	-	-	32
		Average years of service (non-consolidated)	15.0	15.4	15.4	15.5	15.3	14.9
		Attrition rate (%, average for last 3 years, non-consolidated)	5.2	5.1	6.3	1.6	5.5	4.3
	[Safety]	Number of safety patrols (per year, non-consolidated)*2	703	630	648	693	405	589
		Accident frequency rate (non-consolidated)	0.79	2.03	1.76	0.87	1.62	1.85
		Accident severity rate (non-consolidated)	0.03	1.76	0.06	2.16	0.03	0.12
		Number of fatal accidents (per year, non-consolidated)	0	1	0	1	0	1
Environment	Cumulative total of potential CO_2 emission reductions through products (thousands of tons per year, non-consolidated)*3		5,000	5,000	5,000	5,000	4,000	4,000
	CO_2 emissions (t-CO_2 per year, non-consolidated)*4		1,911	1,795	1,758	1,914	2,032	2,130
	Total energy use (GJ per year, non-consolidated)		47,789	45,041	44,406	47,902	50,927	53,801
	Total waste emissions volume (recycling volume) (tons per year, non-consolidated)		250	334	193	314	558	495
	Total waste emissions volume (final disposal) (tons per year, non-consolidated)		125	83	104	120	113	101
	Input volume of water (m^3 per year, non-consolidated)		25,340	23,406	25,390	25,176	25,258	31,387

*1: "Partial Revisions to the 'Accounting Standards for Tax Effect Accounting'" have been applied since FY2019. Those changes have also been applied retroactively since the fiscal year ended March 2018.
*2: The number decreased during FY2020 and FY2021 due to changes in safety patrol methods due to the COVID-19 pandemic.
*3: The calculation method was changed starting in FY2020. *4: Scope 1 and 2 for Head Office, branch offices, and factory.

Trend by segment

Orders received (Millions of yen)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Domestic Environment and Energy Business	163,505	148,892	153,628	123,154	160,591	164,865
Overseas Environment and Energy Business	3,070	3,873	799	1,351	883	2,035
Package Boiler Business	16,724	17,696	17,476	17,925	17,524	16,830
Equipment and Systems Business	8,041	7,141	8,567	6,790	10,166	8,917
Adjustments	(315)	(486)	(642)	(390)	(601)	(404)
Total	**191,026**	**177,116**	**179,829**	**148,830**	**188,563**	**192,244**

Backlog (Millions of yen)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Domestic Environment and Energy Business	203,571	262,388	322,292	337,322	377,143	433,351
Overseas Environment and Energy Business	2,310	2,783	525	733	427	1,457
Package Boiler Business	2,974	3,350	3,872	3,928	4,521	4,852
Equipment and Systems Business	5,326	4,770	4,502	3,453	5,348	5,676
Adjustments	(41)	(231)	(252)	(122)	(288)	(33)
Total	**214,142**	**273,060**	**330,939**	**345,315**	**387,152**	**445,304**

Net sales (Millions of yen)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Domestic Environment and Energy Business	90,643	90,075	93,724	108,123	120,770	108,657
Overseas Environment and Energy Business	2,222	3,401	3,057	1,143	1,188	1,005
Package Boiler Business	17,164	17,321	16,954	17,868	16,931	16,498
Equipment and Systems Business	6,666	7,696	8,836	7,840	8,271	8,590
Adjustments	(387)	(295)	(621)	(521)	(435)	(659)
Total	**116,309**	**118,198**	**121,950**	**134,454**	**146,726**	**134,092**

Operating profit (Millions of yen)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Domestic Environment and Energy Business	11,726	10,487	12,405	10,619	11,475	10,906
Overseas Environment and Energy Business	(154)	78	163	(202)	(140)	(218)
Package Boiler Business	916	1,015	904	966	640	672
Equipment and Systems Business	322	228	361	384	876	656
Adjustments	(1,837)	(1,779)	(2,231)	(2,167)	(2,378)	(2,087)
Total	**10,973**	**10,029**	**11,604**	**9,600**	**10,473**	**9,928**

Ratio of operating profit (%)

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Domestic Environment and Energy Business	12.9	11.6	13.2	9.8	9.5	10.0
Overseas Environment and Energy Business	(6.9)	2.3	5.3	(17.7)	(11.8)	(21.7)
Package Boiler Business	5.3	5.9	5.3	5.4	3.8	4.1
Equipment and Systems Business	4.8	3.0	4.1	4.9	10.6	7.6
Total	**9.4**	**8.5**	**9.5**	**7.1**	**7.1**	**7.4**

Stock Information

Basic share information (as of March 31, 2022)

Business year	April 1 to March 31
Annual General Meeting of Shareholders	June
Record date	Voting rights at the Annual General Meeting of Shareholders: March 31 Distribution of surplus: Year-end dividend: March 31 Intermediate dividend: September 30
Shareholder registry and special account administrator	Mizuho Trust & Banking Co., Ltd.
Contact information	Stock Transfer Agency Department, Mizuho Trust & Banking Co., Ltd. 2-8-4 Izumi, Suginami-ku, Tokyo 168-8507 Toll-free (within Japan): 0120-288-324
Method of public notice	Electronic notices (published on the company's website) (https://www.takuma.co.jp/english/) If it is not possible to publish electronic notices due to an accident or other unforeseen circumstance, public notices will be published in the *Nihon Keizai Shimbun*.
Listed stock exchange	Tokyo Stock Exchange (stock code: 6013)
Share unit	100
Total number of authorized shares	321,840,000
Total number of issued shares	83,000,000
Number of shareholders	7,276

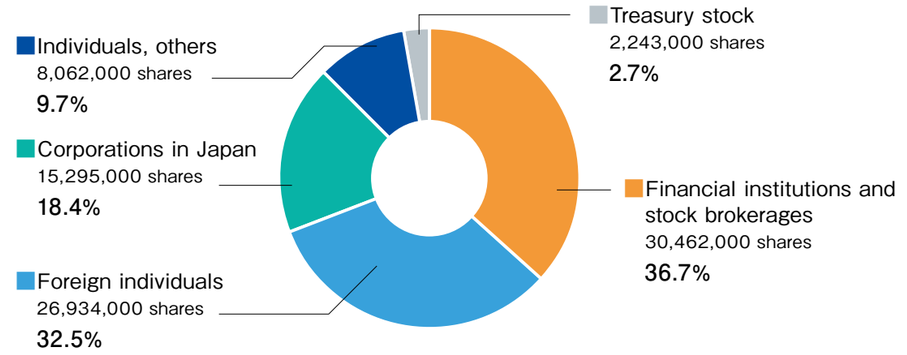
Returns to shareholders

We have adopted the policy of returning profits to shareholders based on a comprehensive consideration of performance and other factors based on the principle of maintaining stable dividends while strengthening our constitution so as to ensure our competitiveness in an increasingly challenging market. In addition to continuing to bolster internal reserves to strengthen our financial position, we plan to use them to increase corporate value by allocating them to capital investment, R&D, and other areas that will facilitate the future growth of our businesses.

	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022 (planned)
Cash dividends (Yen)	13.00	16.00	22.00	31.00	36.00	36.00	36.00
Consolidated dividend payout ratio	12.6%	16.9%	20.5%	34.3%	38.8%	39.3%	—
Share buybacks (Millions of yen)	—	—	—	1,999	—	747*	—

*On February 9, 2022, the Board of Directors authorized a share repurchase through market purchases not to exceed JPY 2 billion or 1.8 million shares (February 10 to June 21, 2022)

Shareholder distribution (as of March 31, 2022)

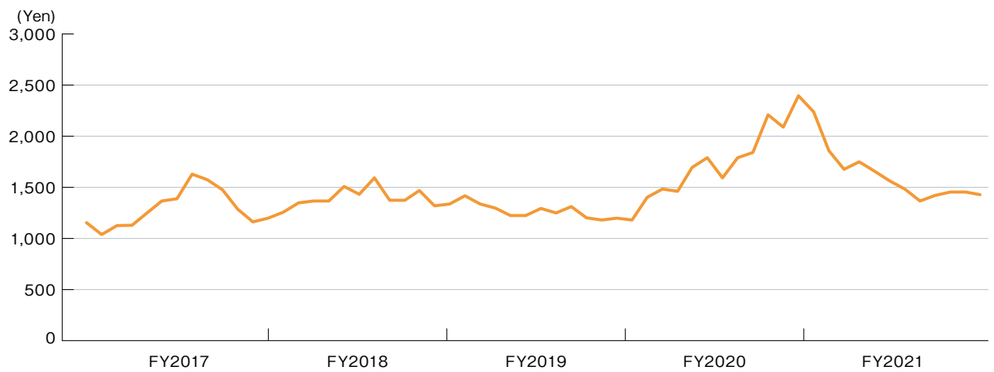


Major shareholders (top 10) (as of March 31, 2022)

Shareholder	Number of shares	Shareholding ratio (%)
The Master Trust Bank of Japan, Ltd. (Trust Account)	11,628,000	14.4
Mizuho Trust & Banking Co., Ltd. (Retirement Benefits Trust, Mizuho Bank, Ltd. Account) Custody Bank of Japan, Ltd. (Re-entrustment)	4,022,000	5.0
Custody Bank of Japan, Ltd. (Trust Account)	3,731,000	4.6
Nippon Life Insurance Company	3,233,000	4.0
HIKARI TSUSHIN, INC.	2,786,000	3.5
JP MORGAN CHASE BANK 385632	2,636,000	3.3
STATE STREET BANK AND TRUST COMPANY 505025	1,965,000	2.4
TAKUMA CO., LTD. Kyoueikai	1,869,000	2.3
BNP PARIBAS SECURITIES SERVICES LUXEMBOURG / JASDEC SECURITIES / UCITS ASSETS	1,674,000	2.1
Sumitomo Mitsui Banking Corporation	1,621,000	2.0

Notes 1. As of March 31, 2022, Takuma held 2,243,000 shares of treasury stock.
Those shares were excluded when calculating the stakes figures for major shareholders as listed above.
2. Stake figures do not include treasury stock figures (2,243,000 shares).

Share price



Company Outline

Company outline

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	Hiroaki Nanjo, President and CEO
Established	June 10, 1938
Capital	13,367 million yen (as of March 31, 2022)
Main businesses	The 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 The design, construction and superintendence of civil, architecture and other works
Number of employees (non-consolidated)	958 (as of March 31, 2022)
Number of employees (consolidated)	4,145 (as of March 31, 2022)

Permits and registrations

Head Office, branch offices and other business offices

Construction license (Minister of Land, Infrastructure, Transport and Tourism license, Special 2-6129) / Construction consultant registration (Minister of Land, Infrastructure, Transport and Tourism registration, Construction 01-10202) / First-class architect office registration (01A02903) / 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) / Manufacture of specific high-pressure gas facilities (Ministry of Economy, Trade and Industry)

JQA-1952
ISO 9001 certification
Head Office, Osaka Office, Tokyo Branch, Chubu Branch, Kyushu Branch, Hokkaido Branch and Harima Factory

JQA-EM0313
ISO 14001 certification
Harima Factory

The Takuma Group Network (As of June 24, 2022)

See Takuma's website for details.

Takuma's business offices

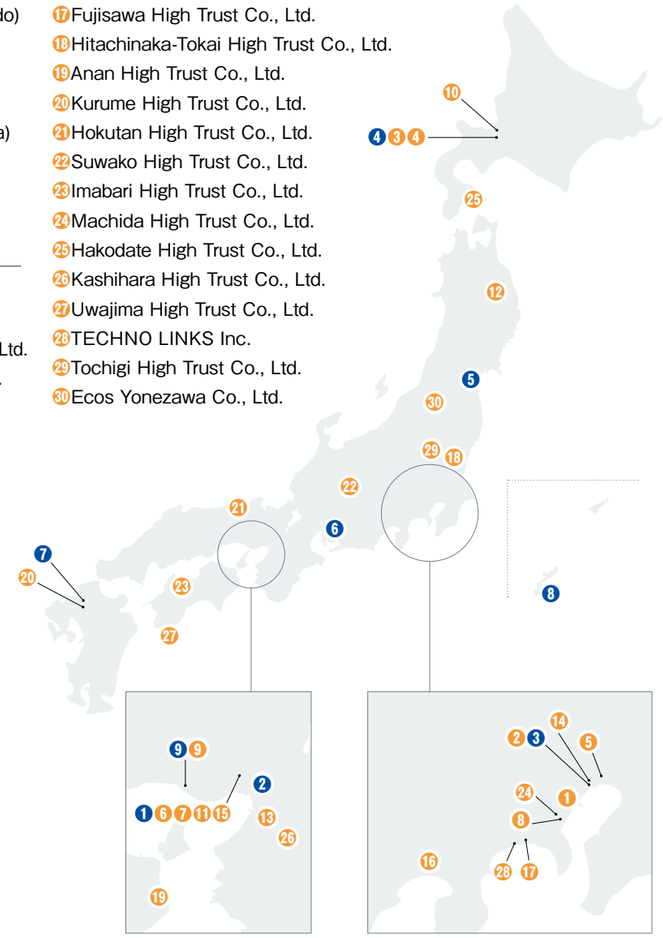
1. Head Office (Amagasaki, Hyogo)
2. Osaka Office (Osaka)
3. Tokyo Branch (Minato-ku, Tokyo)
4. Hokkaido Branch (Sapporo, Hokkaido)
5. Tohoku Branch (Sendai, Miyagi)
6. Chubu Branch (Nagoya, Aichi)
7. Kyushu Branch (Fukuoka)
8. Okinawa Branch (Ginowan, Okinawa)
9. Harima Factory (Takasago, Hyogo)
10. Taipei Branch (Taipei, Taiwan)

Group companies in Japan

1. Nippon Thermoener Co., Ltd.
2. Takuma Technos Co., Ltd.
3. Hokkaido Sanitary Maintenance Co., Ltd.
4. Takuma Technos Hokkaido Co., Ltd.
5. Sunplant Co., Ltd.
6. Takuma Engineering Co., Ltd.
7. Takuma System Control Co., Ltd.
8. Dan-Takuma Technologies Inc.
9. Kankyo Sol-Tech Co., Ltd.
10. Kyoritsu Setsubi Co., Ltd.
11. Takuma Plant Co., Ltd.
12. Iwate-Kenpoku Clean Co., Ltd.
13. Energy Mate Co., Ltd.
14. iMET Co., Ltd.
15. Takuma Energy Co., Ltd.
16. Nagaizumi High Trust Co., Ltd.
17. Fujisawa High Trust Co., Ltd.
18. Hitachinaka-Tokai High Trust Co., Ltd.
19. Anan High Trust Co., Ltd.
20. Kurume High Trust Co., Ltd.
21. Hokutan High Trust Co., Ltd.
22. Suwako High Trust Co., Ltd.
23. Imabari High Trust Co., Ltd.
24. Machida High Trust Co., Ltd.
25. Hakodate High Trust Co., Ltd.
26. Kashihara High Trust Co., Ltd.
27. Uwajima High Trust Co., Ltd.
28. TECHNO LINKS Inc.
29. Tochigi High Trust Co., Ltd.
30. Ecos Yonezawa Co., Ltd.

Group companies overseas

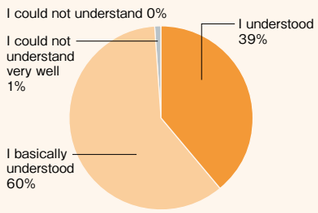
1. Taiden Environtech Co., Ltd.
2. Siam Takuma Co., Ltd.



Takuma CSR Report 2021 Questionnaire Survey Results

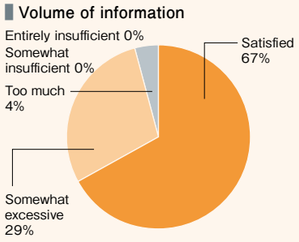
Survey period: July 2021 to June 2022 /
Number of respondents: 1,138

Q1 Did you understand the activities of our company?

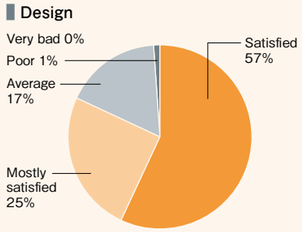


Q2 What is your level of satisfaction regarding this Report?

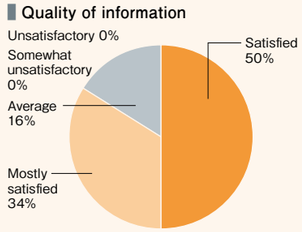
Volume of information



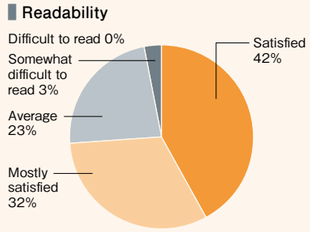
Design



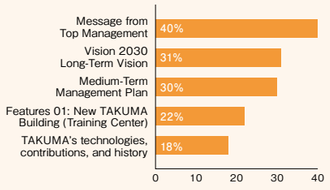
Quality of information



Readability



Q3 Which items were you interested in? (Select up to three, top five responses)



TAKUMA CO., LTD.

2-2-33 Kinrakuji-cho, Amagasaki, Hyogo, 660-0806, Japan
Website: https://www.takuma.co.jp/english/

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Printed on paper made with wood from forest thinning. "Morino Chonai-Kai" (Forest Neighborhood Association)- Supporting sound forest management.