# Environment

Taikisha is working to realize a low carbon society by reducing greenhouse gas (GHG) emissions and environmentally hazardous substances by leveraging its technological expertise cultivated in the HVAC business.



## **Environmental Management**

Taikisha continuously operates the environmental management system to raise awareness of the environment and reduce environmental risks.

### **Environmental Management Vision**

Taikisha strives to improve environmental value for its clients and to protect the global environment using Taikisha's solution technologies as a company engaged in business related to the environment.

#### 1. Improving Environmental Management

- Actively engage in finding solutions for social issues related to the global environment by accurately understanding social trends changing day by day.
- Continuously apply environmental management system and reduce environmental risks.
- Actively disclose environmental information to the public while improving environmental education and awareness in its offices.

## 2. Promoting Environmental Business

- Promote energy management in life cycles and reduce CO<sub>2</sub> emissions during the operation of systems Taikisha supplies.
- Develop technologies for exhaust gas and effluent treatment and contribute to the prevention of environmental pollution.
- Promote R&D of new eco-friendly technologies and products.
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#### 3. Developing Environmental Conservation Activities

Check and minimize energy consumption in its offices and laboratories.

Implement thorough measures regarding the surroundings, construction by-products and harmful materials at its workplaces.

Promote green procurement.

## **Operation and Promotion System**

At Taikisha, the officer in charge of CSR takes the initiative to draw up company-wide action plans, check and assess the status of efforts, and review goals with the purpose of promoting its efforts for environmental protection based on the "Environmental Management Vision." Taikisha will strive to raise its environmental protection activity level by continuously making improvements through the operation of the environmental management system.

Taikisha distributes its environmental policy to its business partners in accordance with the ISO14001 standard and requests their full cooperation in observing the policy.

 Environmental Management System Operation and Promotion System Chart



## **Environmental Management Activities**

Taikisha has set out the Business Division Environmental Policy and Branch Office Environmental Policy based on the Company-wide Environmental Management Vision and Environmental Management Master Plan. Taikisha also evaluates environmental impact in business processes and creates an environmental impact evaluation sheet. Each department breaks them down into a development plan, design policy plan, and project policy plan for each project and development theme, and promotes day-to-day environmental management activities.

The effectiveness of environmental management policies and activities are confirmed at the Corporate Policy Review Meeting, Domestic Business Office General Manager Meeting, Branch Office Management Review Meeting, Development Review Meeting, Design Examination Meeting and Construction Review Meeting, in order to confirm the status of environmental management activities.

#### Deployment of the Environmental Management Activities



## Compliance with Laws and Regulations and Responses to Complaints Regarding Environmental Issues

Taikisha stores information in an internal database about revisions to environment-related laws and regulations that need to be taken into account in conducting business operations and information on ordinances of prefectures and designated cities to disseminate the information to all employees. In addition, Taikisha puts information on laws and regulations relevant to each business process in the Quality Assurance System Diagram to further ensure compliance with such laws and regulations. Taikisha records complaints regarding environmental issues that come up in Taikisha, including information on causes of complaints, remedial measures and preventive measures, in the internal database to share information within the group.

There were no major complaints regarding environmental issues in FY2020. Taikisha conducts employee education in all business offices to prevent the recurrence of complaints that occurred in the past, and provides guidance and education through on-site patrols and other measures.

### Status of Acquisition of ISO Certification

The Green Technology System Division and the Paint Finishing System Division integrated quality and environmental management systems and were certified with ISO Standards 2015.

#### Taikisha Group's Status of Acquisition of ISO Certification

| Country name | Company name                                 |   | ISO<br>14001 |
|--------------|--|---|--------------|
| Japan        | Taikisha Ltd.                                | ٠ |              |
| China        | Wuzhou Taikisha Engineering Co., Ltd.        | ٠ |              |
| Taiwan       | Taikisha (Taiwan) Ltd.                       | ٠ |              |
| Thailand     | Taikisha (Thailand) Co., Ltd.                | ٠ |              |
| Vietnam      | n Taikisha Vietnam Engineering Inc.          |   |              |
| Philippines  | Taikisha Philippines Inc.                    | ٠ |              |
| Singapore    | ingapore Taikisha (Singapore) Pte. Ltd.      |   |              |
| Malaysia     | Iaysia Taikisha Engineering (M) Sdn. Bhd.    |   |              |
| Indonesia    | donesia P. T. Taikisha Indonesia Engineering |   |              |
| India        | lia Taikisha Engineering India Pvt. Ltd.     |   |              |
| USA          | TKS Industrial Company                       |   |              |
| Italy        | Geico S.p.A.                                 | ٠ |              |

The certification acquisition rates at business offices in Japan are 100% in both business divisions.

### **Environmental Accounting**

Taikisha calculates the cost and economic effects of environmental protection based on the basic concept of the Environmental Accounting Guidelines issued by the Ministry of the Environment.

| Environmental protection cost   | Amount of cost  | Main activities   |
|---|---|---|
| The cost within the<br>business area  | 1,780 million yen   | Waste disposal cost, introduction of eco-friendly cars  |
| Management activities cost  | 12 million yen  | In-house environmental<br>management system operation<br>cost, environmental education  |
| Research and development cost   | 313 million yen   | Research and development cost for<br>eco-friendly products and services   |
| Social activity cost  | 1 million yen   | Donation to environment<br>conservation groups  |
|   |   |   |
| Total   | 2,106 million yen   |   |
| Total   | 2,106 million yen   |   |
| Total<br>Economic effects of environmental<br>protection measures   | 2,106 million yen Amount of cost                                      | Main activities   |
| Total<br>Economic effects of environmental<br>protection measures<br>Revenue amount                         | 2,106 million yen<br>Amount of cost<br>6 million yen                  | Main activities<br>Proceeds from the sales of valuables<br>through waste recycling  |
| Total       Economic effects of environmental protection measures       Revenue amount       Cost reduction | 2,106 million yen<br>Amount of cost<br>6 million yen<br>4 million yen | Main activities<br>Proceeds from the sales of valuables<br>through waste recycling<br>Cost reduction effect of introduction<br>of eco-friendly cars |

## Environmental Education (for New Employees)

Taikisha provides introductory education on the Vision and System of Environmental Management and education on the environmental management operations of each department to new employees every year. They also attend "skill training courses for operation chief of specified chemical substances and tetra-alkyl lead, etc.," "skill training courses for operation chief of organic solvent" and "skill training courses for operation chief of oxygen deficient/hydrogen sulfide," and obtain related certifications. This system ensures that new employees learn the necessary knowledge to handle chemical substances and hazardous substances from their first year.

## [Taikisha Group] Efforts for Realizing a Low Carbon Society

Taikisha is working on reducing GHG emissions in the entire supply chain.

### **Risks and Opportunities of Climate Change**

The United Nations adopted the Sustainable Development Goals (SDGs), a set of 17 global goals to be attained by 2030. These SDGs, based on the recognition that climate change is threatening the sustainability of the earth's life support system, strongly urge organizations to take urgent measures to mitigate the impact of climate change. Against such a backdrop, the Paris Agreement governing climate change reduction measures from 2020, adopted at the United Nations Framework Convention on Climate Change (COP21), has come into effect. To realize the aim of the Paris Agreement, which is to limit the rise in global average temperature, it is important to take measures toward realizing low-carbon emissions to reduce greenhouse gas (GHG) emissions and, furthermore, zero-carbon emissions.

Taikisha recognizes climate change risks such as the potential disturbance of the continuity of business due to typhoons, heavy rain and other natural disasters, business development being affected by the tightening of environmental regulations, and inadequate environmental efforts resulting in loss of business opportunities and clients.

On the other hand, Taikisha expects that climate change could expand customer needs for environmental measures and create opportunities for many clients to utilize Taikisha's environmental technologies.

Specifically, in accordance with the progress of technology innovation in power generation and heat supply facilities using natural energy (solar power, wind power, hydropower and geothermal power), the Company expects to see demand rise for installation work of energy-related facilities, including rebuilding of existing heat source supply system and construction of new plants, as well as for energy conversion facilities such as for renewable energy generation and exhaust recycling of hydrogen fuel cells.

By capturing such opportunities accurately, Taikisha will promote "zero-carbon emissions" through its business operations.

## **Energy- and Resource-Saving Achievements**

Taikisha's power usage in all offices (Japanese offices) in FY2020 was 137 kWh/m<sup>2</sup>. Taikisha will continue to conduct energy-saving and consumption-reduction activities by raising the awareness of each employee to ensure the implementation of energy-saving measures, such as observing Cool Biz and setting air conditioners at energy-efficient temperatures.

## Grasping the Level of Scope 1 and 2 Emissions to Reduce CO<sub>2</sub> Emissions

Companies are being required to reduce GHG emissions through business operations at construction sites and offices to help curb global warming.

Looking at Taikisha's GHG emissions in FY2020, Scope 1 emissions, which are direct emissions from combustion of fuels, etc., were 1,438 t-CO<sub>2</sub>, and Scope 2 emissions, which are indirect emissions from use of electricity, etc., were 1,136 t-CO<sub>2</sub>. Taikisha will continue to work on saving energy at construction sites and offices.



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## **Breakdown of Scope 3 Emissions**

Looking at Taikisha's GHG emissions in the supply chain for FY2020, Scope 3 emissions were 3,870,868 t-CO<sub>2</sub>, of which emissions from Category 11 (use of sold products) accounted for the largest portion at 92.93%. Considering that GHG emissions from the operation phase of the facilities Taikisha provides are largest across its supply chain, Taikisha will make greater efforts than ever to provide facilities and systems with high energy-saving capabilities.

### Initiatives in the Green Technology System Business

To promote a low carbon society, the Green Technology System Business is focused on making energy-saving proposals at the operation phase of clients' air-conditioning and sanitary facilities.

Taikisha is engaged in the design and construction of air- conditioning and sanitary facilities for clients in broad areas, such as factories, office buildings and hospitals in Japan and overseas. The volumes of CO<sub>2</sub> emissions from the operation of those facilities over many years significantly exceed the CO<sub>2</sub> emissions from the construction of buildings. The Green Technology System Division proposes systems that reduce energy consumption throughout the life cycle of buildings and offer superior technologies to reduce carbon emissions and environmental impact.

In addition, Taikisha will further promote green procurement by cooperating with suppliers and continue to reduce construction byproducts and to appropriately dispose of industrial waste, aiming to curb GHG emissions from production, transportation, and disposal of materials and to help conserve the global environment.

#### **Initiatives in the Paint Finishing System Business**

The Paint Finishing System Business is engaged in the design and construction of large-scale paint finishing plants of automobile and aircraft makers in Japan and overseas. Reducing CO<sub>2</sub> emissions in the paint process at these plants has become an important issue in the automobile and aircraft industries. By providing solutions for this issue, Taikisha contributes to clients' low carbon operation.

Taikisha strives to promote the energy efficiency and downsizing of facilities by using an energy calculation model for paint finishing lines and setting medium-term reduction targets. Taikisha also makes proposals to reduce CO<sub>2</sub> emissions by introducing renewable energy and a system to recover waste heat from lower temperature sources.

> Please see the pages below for details. Activities to reduce CO<sub>2</sub> emissions from the

Development of new mid-term plan to achieve

paint finishing process

carbon neutrality

Please see the pages below for details • Eco-friendly design and energy-saving proposal P.49 activities Development of energy-The Company's saving technologies sustainability webpage



\*Emission factor is calculated based on the Emission Factor Database on Accounting for Greenhouse Gas Emissions throughout the Supply Chain (ver.3.1) of the Ministry of the Environment and LCI Database IDEAv2 (for calculating greenhouse gas emissions in supply chain) of The National Institute of Advanced Industrial Science and Technology, Research Institute of Science for Safety and Sustainability, Advanced LCA Research Group, Sustainable Management Promotion Organization

|                           | Scope/Category   | Accounting methods*   | Emission amount (t-CO2) |
|---------------------------|--|---|-------------------------|
| Scope 1                   |  | -   | 1,438                   |
| Scope 2                   |  | -   | 1,136                   |
|                           |  |   | 3,870,868               |
| Category 1                | Purchased goods and services                                     | Calculated from (raw) materials procurement amount (in value terms)   | 218,253                 |
| Category 2                | Capital goods  | Calculated from amount of capital investment  | 1,773                   |
| Category 3                | Fuel- and energy-related activities not included in Scope 1 or 2 | Calculated from purchased amount of electricity and fuels   | 388                     |
| Category 4                | Transportation and delivery (upstream)                           | Calculated from transportation costs accompanying<br>procurement of (raw) materials   | 22,998                  |
| Category 5                | Waste generated in operations                                    | Calculated from amount of waste discharged by type  | 1,417                   |
| Category 6                | Business travel  | Calculated from travel expenses paid by mode of<br>transportation   | 24,817                  |
| Category 7                | Employee commuting   | Calculated from transportation expenses paid to<br>employees  | 369                     |
| Category 8                | Leased assets (upstream)   | Included in Scope 1 and 2 emission calculation  | -                       |
| Category 9                | Transportation and delivery<br>(downstream)                      | No relevant activities  | -                       |
| Category 10               | Processing of sold products                                      | There are some products that are relevant, but calculations<br>are ignored because their ratios in sales are extremely<br>small.  | -                       |
| Category 11               | Use of sold products   | Calculated from emissions from operation of facilities<br>Taikisha provided, HFC leakage from equipment Taikisha<br>provided, and estimated useful lives  | 3,599,767               |
| Category 12               | End-of-life treatment of sold<br>products                        | Calculated from weight of main equipment by type  | 1,086                   |
| Category 13               | Leased assets (downstream)                                       | No relevant activities  | -                       |
| Category 14               | Franchises   | No relevant activities  | -                       |
| Category 15 Investments   |  | Calculations are ignored because the validity of the<br>category 15 estimates is low as a result of many portfolio<br>companies not disclosing Scope 1 and 2 emissions and the<br>impact of the category 15 estimates on the entire supply<br>chain is small. | -                       |
| Total of Scope 1, 2 and 3 |  |   |                         |

#### Breakdown of Scope/Category

## [Green Technology System Division] Efforts for Realizing a Low Carbon Society

Taikisha is helping to reduce GHG emissions at the operation phase of the air-conditioning and sanitary facilities it provides to clients.

#### Activities in the Field of Air-Conditioning System for Buildings and Factories

### **Eco-Friendly Design**

The Green Technology System Business, as part of promoting eco-friendly designs, makes proposals for improving the energy efficiency (reducing environmental impacts) of facilities owned by clients. In energy-saving proposal activities, the Division repeats the cycle of energy-saving diagnosis to grasp the current status, make detailed proposals based on clients' future visions, design and construction, and verify the effects in the operation phase.

To contribute to the target reduction in energy-originated  $CO_2$ emissions by FY2030 (25.0% reduction compared with FY2013) under the Plan for Global Warming Countermeasures, a Cabinet decision made in May 2016, Taikisha has developed a proprietary simulation-based Energy Plant Optimal Control System, which maximizes the amount of energy saved by heat source systems through optimal operation control according to external conditions that change from hour to hour and thus helps reduce  $CO_2$  emissions and running costs.

Taikisha is also working on the development of energy-saving technologies of clean room systems that control the circulating air volume by tracking the operation status of production equipment, staffing and indoor environment as well as room pressure control systems, by incorporating the technological progress of AI and IoT in air-conditioning systems to adapt to smart plants and buildings.

Taikisha defines the rate of  $CO_2$  emissions reduced from facilities owned by clients due to Taikisha's proposals as the rate of  $CO_2$ reductions. The transition in the rate of  $CO_2$  reductions for the past 10 years is shown in Figure 1. In FY2020, Taikisha conducted activities by setting a target for the rate of  $CO_2$  reductions of a weighted average of 25% or higher in in-house design projects, and Taikisha exceeded the target at 29.9%. (The rate of  $CO_2$  reductions achieved through proposals for each fiscal year is based on the most recent result of each proposal.) The number of proposals and the proposed amount of  $CO_2$  emission reductions are classified by commercial client (for offices and hospitals, etc.) and industrial client (plants, etc.) and their transitions are shown in Figure 2. The amount of proposed  $CO_2$  emission reductions that corresponds to Category 11 under Scope 3 was about 948,000 t- $CO_2$ (the effect of 15 years of operation).









In light of the social goal of substantially reducing CO<sub>2</sub> emissions by 2030, Taikisha has set a new medium-term plan target for 2020 and beyond to reduce its CO<sub>2</sub> emission factor in designing and construction by 25% by 2030 (as compared with the 2013 emissions level, estimated based on net sales of completed construction contracts).

In order to achieve the medium-term plan, Taikisha will utilize energy-saving technologies in its current portfolio as well as new energy-saving technologies currently being developed such as production device tracking control.



#### Roadmap for reduction of CO<sub>2</sub> emissions (illustration)

## [Paint Finishing System Division] Efforts for Realizing a Low Carbon Society

Taikisha is helping to reduce GHG emissions in the paint finishing process for automobiles, etc.

### Activities in the Field of Automobile Paint Finishing Systems

## Activities to Reduce CO<sub>2</sub> Emissions from the Paint Finishing Process

In order to help reduce the environmental impact of the paint finishing process, in which energy usage is particularly high in the automobile manufacturing process, the Paint Finishing System Business has proposed plans to reduce  $CO_2$  emissions from paint facilities in the automobile manufacturing process.

Since 2000, Taikisha has been examining proposals in each fiscal year to meet the medium-term target of 70 kg-CO<sub>2</sub>/unit in 2020 by calculating the reduction in CO<sub>2</sub> emissions using the energy estimation model for automobile paint finishing lines.

CO<sub>2</sub> emissions, which were 160.1 kg-CO<sub>2</sub>/unit in 2005, decreased to 100 kg-CO<sub>2</sub>/unit, which is the first medium-term target, by 2012. By 2015, Taikisha reduced CO<sub>2</sub> emissions further to 80 kg-CO<sub>2</sub>/unit, which is the second medium-term target, by promoting facility technologies such as dry circular (dry booths that use pre-coating materials).

In 2020, the Company introduced new technologies including dry booth using cardboard filter and compact air-conditioner using energy-saving mist moisturizing system, and achieved the third medium-term target set in 2015 at 70 kg-CO<sub>2</sub>/unit.

## Development of New Medium-Term Plan to Achieve Carbon Neutrality

As of 2021, in the light of the situation of greenhouse gas emission in countries across the world, governments as well as automobile manufacturers, who form our clientele, are increasingly setting targets and deliberate measures to achieve carbon neutrality. Under these circumstances, the Paint Finishing System Division will set a new medium-to long-term CO<sub>2</sub> reduction target in automobile painting process in FY2021, in view of long-term low-carbon targets of automobile manufacturers. Specifically, Taikisha is considering the following initiatives to contribute to the realization of carbon neutrality and conservation of the global environment in collaboration with automobile manufacturers and other related companies.

Proposal for CO<sub>2</sub> reduction in automobile painting process

Initiatives to reduce CO2 emissions



Target zero CO2 emissions

#### O2 emissions estimates at automobile paint finishing plants: Transition in CO2 emission reductions proposed and future target

Pretreatment Electrodeposition Oven Main booth/air-conditioning equipment Flash-off Simple booth/air-conditioning equipment Other (kq-CO:/unit)

