

Realization of a Sustainable and Environmentally Friendly Society

Environmental Policy and Environmental Targets

Based on the Group Philosophy “To Create a Vibrant Environment for All Members of Society,” the Taisei Group has set forth in its Environmental Policy and Environmental Targets, the formation of high-quality social capital through corporate activities centered on the construction business in harmony with nature.

The construction industry, which is involved in the formation of social capital, is built on the burden on the environment. On the other hand, environmental problems are becoming more and more serious on a global scale, and long-term countermeasures are required. In response to these circumstances, in 2018 we revised our medium and long-term goals, the 2050 Environmental Targets (TAISEI Green Target 2050), based on environmental issues such as climate change, recycling of resources, co-existing with nature, and environmental pollution risk. As a group, we are striving to accomplish the “Realization of a Sustainable and Environmentally Friendly Society.”



Environmental Policy
 WEB <https://www.taisei.co.jp/english/profile/philosophy/policies/>

Realization of a Sustainable and Environmentally Friendly Society

Environmental Management System (EMS)

Taisei Corporation operates an environmental management system based on [ISO14001](#) (hereinafter “EMS”) on a company-wide basis. We have set the Environmental Management Committee chaired by the President, which deliberates and decides on important initiatives for environmental management that leads to the Environmental Policy, medium- to long-term targets, and external evaluations. In addition, risks and opportunities concerning the environment are identified in the EMS, with reference to the recommendations of [TCFD](#), in consideration of compliance with related laws and regulations, as well as various internal and external environmental issues including climate change and social demands. As for cross-divisional environmental issues, the CSR Committee, Central Safety Committee, and the like, have been established to discuss initiatives to address them.

In addition, the Taisei Group Environment Promotion Council has been established for domestic Group companies to promote group-wide initiatives.

EMS Organization (ISO14001)



*ISO14001

An international standard for environmental management systems. Since 1998, the Company has acquired certification on a company-wide basis (Head Office and 13 branch offices).

ISO14001 certification

- Scope: The head office and all 13 branch offices (certified rate: 100%)
- Certification registered in 1998



*TCFD

Task Force on Climate-Related Financial Disclosures

TAISEI Sustainable Action (TSA)—An Initiative to Reduce Environmental Impact

To achieve its Environmental Policy and Environmental Targets, Taisei Corporation is implementing [TAISEI Sustainable Action \(TSA\)](#), an environmental impact reduction initiative in which all employees participate. In proceeding with this initiative, it is particularly important for many parties involved in construction, which has high CO₂ emissions, to be aware of the importance of reducing environmental impact. Therefore, in addition to the “[CO₂ Zero Action](#),” which is our basic initiative that has been conducted at all worksites so far, effective specific technologies and activities are summarized in the “Action List,” and the materials, products and technologies used are explained in an easy-to-understand manner with photographs. In addition, the Company has established an award system for activities aimed at achieving the Environmental Targets.

Through this system we evaluate activities to reduce environmental impact, which serves as a model for other divisions, and we work to raise employees’ environmental awareness.

* TAISEI Sustainable Action (TSA)

Company-wide activities to reduce environmental impact including fuel-efficient driving of heavy machinery and vehicles, use of hybrid heavy machinery and renewable energy, development of a wellness conscious greening environment, paperless meetings, and use of LEDs for temporary lighting.

* CO₂ Zero Action

An initiative to reduce environmental impact undertaken by all worksites. There are seven actions, including eco-driving of heavy machinery and vehicles, inspection and maintenance, and controlling the temperature setting of air conditioners.

Disclosure of Information on Environmental Initiatives

Taisei Corporation strives to improve its environmental performance by steadily carrying out activities based on its Environmental Policy, and by actively disclosing information through the Company’s website, the integrated report, and other means. We strive to increase the trust of our stakeholders, and deliver value to them and create sustainable business opportunities. In July 2020, the Company agreed with TCFD and decided to actively disclose information on the impact of climate change on its business activities.

Realization of a Sustainable and Environmentally Friendly Society

Results of environmental targets for 2019 and targets for 2020

TAISEI Green Target 2050	Annual Targets	FY2019		FY2020
		Target Values	Results Values	Target Values
Low Carbon Society 	At construction stage ^{*1} KPI Reduction rate of CO₂ emissions per construction cost (intensity)	-26%	-32.0%	-27%
	At construction stage ^{*1} KPI Reduction rate of total CO₂ emissions ※	-51%	-43.7%	-52%
	At building operation stage ^{*1} KPI Reduction rate of estimated CO₂ emissions ※	-39%	-39.5%	-40%
	Reduction of energy consumption per office floor area (intensity) ^{*2}	-19%	-23.3%	-20%
Recycling Oriented Society 	Adoption of green (environmentally conscious) procurement items at building design stage	10 item/ Per Project or more	10 item/ Per Project	10 item/ Per Project or more
	Final disposal rate of construction wastes KPI ※	3.4% or less	3.9%	3.4% or less
Nature Co-existing Society 	Implementation of biodiversity conscious proposal Number of proposals and deployment of biodiversity-related technologies KPI	30 Project or more	46 Project	30 Project or more
	Implementation of biodiversity conscious construction	10 Projects or more	6 Projects	10 Projects or more
Safety Secured Society 	Proper management of construction waste, etc. and compliance with environmental-related laws and regulations KPI	0	1	0

*1 compared to FY1990

*2 compared to FY2010

● KPI Key performance indicator

※ Part of "Eco-First Commitment"



*Taisei Corporation made the "Eco-First Commitment" pledge to the Japanese Environment Minister to carry out environmental conservation measures on a group-wide basis, and was officially approved as an "Eco-First Company".

For Realization of Low Carbon Society

For Realization of Low Carbon Society (Risks and Opportunities)

For the construction industry, rising temperatures in recent years, large-scale typhoons, and disasters caused by extremely concentrated heavy rain pose risk factors such as interruptions and delays in construction work. On the other hand, increased demand for net Zero Energy Buildings (ZEB), which is a measure to mitigate climate change, will lead to the creation of opportunities for orders. In the field of renewable energy, Taisei Corporation is working on ZEB and developing technologies for floating offshore wind power generation facilities. In addition, we consider the **green infrastructure** promoted by the Ministry of Land, Infrastructure, Transport and Tourism as a means of mitigating and adapting to climate change as one of the opportunities to receive orders through our market expansion aimed at strengthening infrastructure, and we are promoting relevant technology development and design proposals.

Medium- and Long-Term Initiatives

Taisei Corporation's two CO₂ emission reduction targets for 2030, which are benchmarks of "TAISEI Green Target 2050," have been certified by the **SBT initiative**. One is the CO₂ reduction target at the construction stage. To achieve this target, we are promoting initiatives to reduce the environmental impact (TSA) in which all employees participate, as well as energy conservation activities by specialized contractors (cooperating companies) and the use of heavy machinery and vehicles with high energy efficiency. The other target is to reduce CO₂ emissions in buildings used by customers. The Company is promoting the provision of advanced energy conservation and ZEB technology, as well as the accumulation of construction results. We will work with various stakeholders in the value chain to achieve our targets.

[Taisei Corporation's SBT per scope]

- Scope 1 : Direct emissions associated with fuel use for heavy machinery and vehicles at construction worksites
- Scope 2 : Indirect emissions associated with electricity use at construction worksites Reduce greenhouse gas emissions (Scope 1 + Scope 2) by 26% from FY2013 levels by 2030
- Scope 3*: Indirect emissions associated with energy use during the operational phase of the building delivered Reduce greenhouse gas emissions by 25% from FY 2013 levels by 2030

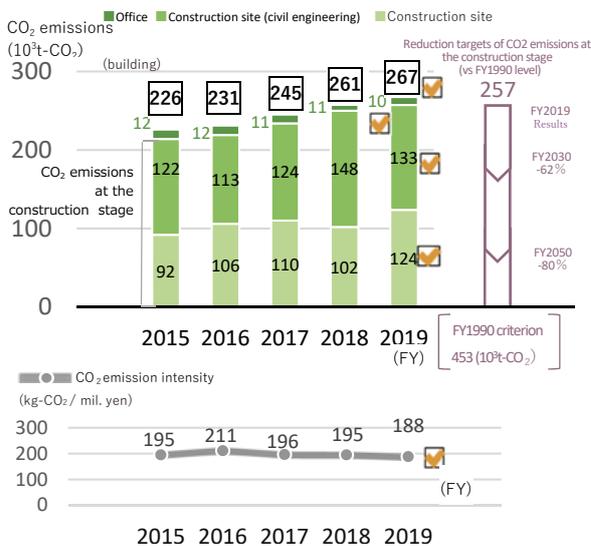
* SBT initiative

Founded in 2015, this organization (initiative) requires companies to establish "Science Based Targets (SBT)" to contribute to the Paris Agreement, which has set the goal of limiting temperature increase to less than 2°C above the pre-industrial level.

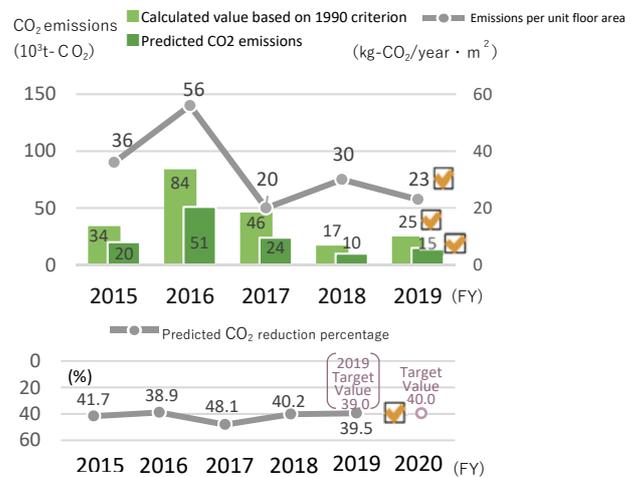


* Scope 3 data responds to the CDP Climate Change Questionnaire, an international non-profit organization. CDP 2019 was A-rated.

CO₂ Emission by Business



Predicted of CO₂ emissions in the building operation stage and reduction percentage (Non-consolidated)



For Realization of Low Carbon Society

● Promoting ZEB for Buildings Designed by Taisei Corporation

Taisei Corporation calculates Scope 3 emissions for ten categories related to its business. By promoting energy saving and ZEB in buildings that we design, the reduction rates of predicted CO2 emissions at the stage of building operations will be improved. This helps reduce the CO2 emissions in Category 11 (use of products sold) in Scope 3 based on the GHG protocol criteria. We are currently steadily accumulating results and accelerating the spread of highly marketable ZEB.



The Next Generation R&D Building at the Taisei Advanced Center of Technology

● Acquired ZEB Ready Certification for the First Time in Japan as a Temporary Worksite Office

In order to further promote energy conservation at temporary worksites, we obtained **ZEB Ready** certification for the first time in Japan for two advanced environment-conscious worksite offices.

The main feature of this initiative is that the combination of highly versatile equipment and materials meets the ZEB certification specifications. These specifications are easy to install in temporary offices, which are often covered by lease contracts. By presenting them as a standard model of a worksite office in the near future, this initiative aims to spread energy-saving worksites throughout the industry.



Akasaka Junior High School, etc., Maintenance Work Worksite Office

*** ZEB Ready**

It is a building that is very close to ZEB, satisfies ZEB Ready requirements and has reduced annual prime energy consumption volume to almost zero by utilizing renewable energy. It should fulfill the: reduction of standard primary energy consumption volume by 50% or more (excluding renewable energy).

● Promoting Green Infrastructure^{*3} as a Measure for Adapting to Climate Change

In the Shinagawa Season Terrace, a multi-purpose building that makes effective use of the upper part of the Water Reclamation Center, we built a reservoir for rainwater in the basement of the Center, in order to temporarily store water during the early stages of heavy rain, to prevent polluted water from flowing directly into the sea. The building demonstrates other multifaceted functions of green structures, including the creation of a wide open green space situated on artificial ground constructed above the ground, reduction of the heat island effect on the city by using this greenery to cool wind from the Tokyo Bay before sending it into the city area, and conservation of biodiversity by fostering new ecosystems through waterfront creation using rainwater.



Shinagawa Season Terrace Green Promenade.

Underground sewerage facilities of the Shinagawa Season Terrace. (reservoir for rainwater)

^{*3} Green Infrastructure :In urban planning, actively using the natural functions of weather, soil and plants to create roads and facilities. This is a new infrastructure concept that uses the functions of natural ecosystems to build social capital and manage national territory.

● Memorandum of Understanding Signed for Joint Development of Floating Offshore Wind Facilities

We signed a memorandum of understanding with French company Ideol SA on the development and market development of floating foundations for concrete floating offshore wind power generation facilities. It is said that the potential of floating offshore wind power generation in Japanese sea areas is approximately three times larger than that of bottom-fixed wind power generation. Going forward, we will accelerate the introduction of concrete floating offshore wind power generation through cooperation with the company, aiming to develop markets in Japanese sea areas.

● Project to demonstrate a low pressure hydrogen delivery system to promote hydrogen Use in buildings and city infrastructure

Project to demonstrate a low pressure hydrogen delivery system (PDF)
https://www.env.go.jp/seisaku/list/ondanka_saisei/lowcarbon-h2-sc/demonstration-business/PDF/project.pdf

WEB

For Realization of a Recycling Oriented Society

For Realization of a Recycling Oriented Society (Risks and Opportunities)

Although it is important to control the quality, delivery time, and cost of materials and equipment used in construction work, there is a growing need to promote sustainable procurement throughout the supply chain, such as measures to deal with the problem of disposable plastics and other natural environmental pollution caused by waste, resource conservation, and the use of materials that can be recycled and reused.

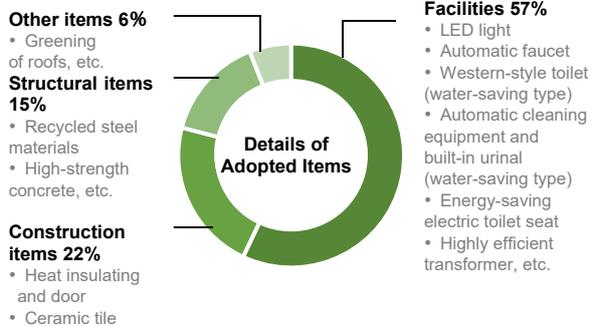
At Taisei Corporation, we are working on waste management and the recycling of resources at worksites, adopting materials and equipment that take into account the lifecycle from the design stage based on green procurement, and providing technologies to extend the life of buildings.

Utilizing the Green Procurement Guideline in Cooperation with Suppliers

In 2001, the Taisei Corporation Green Procurement Guideline was established and put into effect to promote the use of materials, equipment and building methods that have small environmental burden during the design, construction, operation and demolition of structures. By referring to and reflecting the content of the Green Purchase Law, we review the subject items every year.

In FY2019, 93 items were included in the guideline. Through CSR procurement, we are also Promoting environmental consideration for procurement when we work with suppliers.

Adoption of Green Procurement Item (Construction design phase: non-consolidated)



Effective Use of Waste Plastics

Construction materials, packaging materials, and other waste plastics are sorted thoroughly and properly recycled by specialized disposal companies. Large foamed materials may be melted with a solution to reduce the volume to be treated. In addition, we are implementing measures to utilize waste plastic by combining it with waste wood products and creating artificial recycled wood products.

Taisei Corporation supports the [Plastics Smart](#) Campaign by the Ministry of the Environment.



As initiatives for the recycling of water resources, we implement on-site utilization of rainwater and spring water as part of our efforts to reduce the environmental impact at construction sites. We provide sand basins and water retention tanks to store water and prevent flooding in case of heavy rain and also to settle dust by sprinkling the stored water.

*Plastics Smart

A campaign by the Ministry of the Environment to promote "a smart way of dealing with plastic" nationwide, including thorough elimination of littering and illegal dumping, and thorough reduction of single-use plastic and sorting and collection.



For Realization of a Recycling Oriented Society

● Resources at Worksites

The emission volume of construction waste varies depending on the scale and type of construction. In general, the bigger the construction is, the larger the amount of waste becomes.

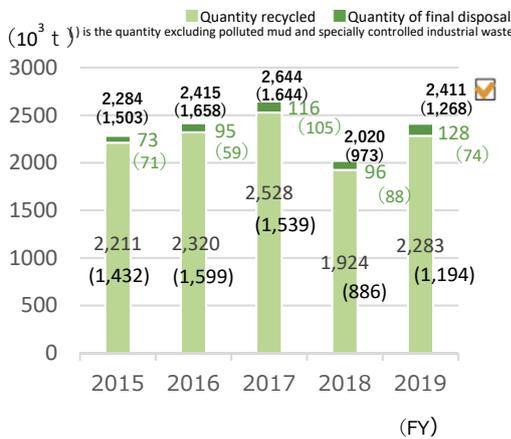
However, most of the waste is strictly sorted and transported by specialists. Then, it is treated by removing dirt which became attached after construction and recycled. The ratio of the final disposal of the emitted waste, such as disposal at the final waste disposal site, is less than 4%.

Currently, we operate a "routine collection system" for many types of waste, including waste plastics at our construction sites in Japan. In the future, we will continue to analyze data to obtain an efficient collection frequency as well as mechanisms for collaboration between construction sites, and stabilize the loading ratios of collection vehicles. We are also considering promoting nationwide deployment and aim to achieve a final disposal rate of 0% for construction waste in 2050.

*This technology has received the Ministry of Economy, Trade and Industry's Industrial Technology and Environment Bureau Director's Award in the 2020 Resource Recycling Technology and System Awards.



Quantity of Construction Waste (Non- Consolidated)



Emissions and Recycling Rate by Construction Waste Category (Non-Consolidated)

Unit : 10³ t

Construction waste	Civil engineering	Building construction			Total	Recycling rate
		New construction	Demolition	Subtotal		
Concrete	193	236	359	595	788	100%
Asphalt - concrete	72	47	12	59	132	99.5%
Construction site sludge	778	260	12	272	1,049	-
Mixed Waste	28	38	19	57	86	60.2%
Wood scrap	18	12	3	15	33	95.0%
Metal scrap	2	17	20	37	39	98.9%
Miscellaneous	134	111	40	151	285	71.4%
Total	1,225	721	465	1,186	2,411	-

For Realization of a Nature Co-Existing Society

■ For Realization of a Nature Co-Existing Society (Risks and Opportunities)

There is always a concern that construction would significantly affect the surrounding environment including nature. During the planning phase, we extract risks such as the violation of environmental laws and regulations as well as opportunities including chances to add value. We pay attention to biodiversity until the operation and management support phase after construction, and provide solutions to create a rich environment to customers. We will contribute to the achievement of a society that cohabits with nature by properly evaluating the value of natural resources to utilize for the development of infrastructure and buildings and reducing the influence of construction.

● Declaration of Taisei Corporation on Biodiversity Preservation

Taisei Corporation has agreed to the Declaration of Biodiversity by Keidanren (Japan Business Federation), and formulated the “Declaration of TAISEI on Biodiversity Preservation” in September 2010, in order to clarify its corporate stance on the conservation and creation of biodiversity.

WEB Declaration of Taisei Corporation on Biodiversity Preservation
<https://www.taisei.co.jp/english/profile/philosophy/policies/>

● Biodiversity-Conscious Investigation, Planning, Construction and Monitoring

We are engaged in the conservation and regeneration of the natural environment with Ecological Planning, our proprietary environmental planning tactics.

We improve quality of social capital by investigating and analyzing not only planned sites but also their surrounding environments to carry out construction under a plan that takes into account regional characteristics.

We conduct monitoring after completion and learn from feedback to deepen our technology. As the third round of the “Concierge Series,” we have newly designed “Waterfront Concierge” to apply to a project that calls for conservation of rare flora and fauna, striving to contribute to the realization of a society that co-exist with nature.

● Improvement of Facility Value through Biodiversity Conservation and Creation

An environmental certification that proves natural environmental consciousness of a facility increases the value of the facility and appeals to customers as proof of an environmentally conscious company.

Taisei Corporation takes advantage as a comprehensive constructor having the integrated capabilities from facility planning to design and construction, through which it supports customers’ environmental activity such as biodiversity conservation and creation, including the acquisition of environmental certifications.

At the stage of planning and design of the ESR Amagasaki Distribution Center (ordered by ESR), a logistic facility located at the Osaka bay-side area, for example, an outer green area was planned, designed, and constructed by Taisei Corporation to help improve the biodiversity without affecting capabilities as a logistics facility.

The facility earned the “Business Innovation in Harmony with Nature and Community” certification from the Association for Business Innovation in Harmony with Nature and Community (ABINC) as a logistics facility that respects biodiversity.



ESR Amagasaki Distribution Center (ordered by ESR)

For Realization of a Nature Co-Existing Society

● Consideration of biodiversity for proposal (Concierge series)

During civil engineering works, there are many chances to face the natural environment. We propose various measures to conserve biodiversity including protection of endangered species of fauna and flora and efforts to minimize our impact on them. As for construction, our unique biodiversity evaluation tools such as **Ikimono Concierge®**, **Mori Concierge®**, and **Mizube Concierge®** are effectively used for greening plans at construction sites or for redevelopment projects to actively make proposals.



Mizube Concierge, our unique planning tool to protect and compensate for endangered riparian animals and plants whose habitat is affected by development.

*Concierge Series

- **Ikimono Concierge** : Our unique tool for predicting and identifying animals that can be attracted by a planning site
- **Mori Concierge** : Our unique tool enabling the selection of plants that can adapt to the environment of a planning site
- **Mizube Concierge** : Our tool for developing a unique plan to conserve and compensate waterside rare flora and fauna whose ecosystems may be affected by construction

● Implementation of Activities to Contribute to Environment and Society in Cooperation with Various Stakeholders ^{*1}

Our approach to enhancing biodiversity is guided by Environmental Policy and Declaration of Biodiversity Preservation, and demonstrated as a company-wide activity to reduce environmental impact under our unique biodiversity conservation guidelines, etc. Not limited to biodiversity consideration in the business, our efforts include offering volunteer opportunities for the Group employees and their families to make nest boxes for dormice as part of natural environmental education through forest conservation activity, and to participate in **Tokyo Greenship Action** for more than ten years.

*1 ※ Part of "Eco-First Commitment"(See P.3)



*2 Tokyo Greenship Action, which is nature conservation program

● The Taisei Group Environmental Volunteers

1) Making dormouse nest boxes

Since 2004, Taisei Corporation has participated in the Animal Pathway (bridges for tree-dwelling rodents) Research Society, and has supported ecosystem conservation activities for tree-dwelling rodents, such as the dormouse, through development and facilities for animal pathways and monitoring. As part of these activities, our group employees and their families participate every year in volunteer activities to construct make dormouse nest boxes and donate to the Dormouse Museum of KEEP, Inc. We have conducted this environmental volunteering activity every year, with participants working to build a total of 2,945 dormouse nest boxes, thus far.



Dormouse nest boxes made in volunteer activities:

2,945



Employees participating in the "TAISEI 1 ton CLUB"

1,605



Status of saplings for donation for planting

2) TAISEI 1 Ton CLUB

Since 2010, we have conducted this environmental contribution activity a total of nine times, under the theme of "simultaneously achieving carbon offsets at the Company and in the homes of employees."

In 2012 and 2015, we supported the Kamaishi Forest Owner's Association, which manages the mountain forests of Unosumai District. On May 9, 2017, a large-scale wild fire occurred in the District due to a suspicious fire, resulting in the burning of 413 hectares as well as heavy damage. We continued our support for the Kamaishi Forest Owner's Association through fundraising to donate the cost of planting saplings for the reforestation of Kamaishi Forest. Trees that had been felled by the wild fire in the Unosumai District were used to make novelty items for employees participating in this initiative. They were also used to make wooden seats, public toilets, benches and louvers sunshades for the Kamaishi Unosumai Memorial Stadium, which we were involved in the construction of.

For Realization of a Safe Secured Society

For Realization of a Safe Secure Society (Risks and Opportunities)

Environment pollution caused by construction has a significant impact on the surroundings and society. Compliance with environmental laws and regulations is always one of the most important environmental issues. We keep contributing to the reduction of environmental risks of society by promoting the proper management of construction waste, the development of new technologies and measures to cope with the regulations for soil pollution which are expected to become stricter than now.

Risk Measures at Worksite

With a worksite environment patrol, the Environment Department of the Head Office and branches conduct an internal audit to check the observance of the environment law at worksites. As for the findings, we establish corrective and preventative measures for continuous improvement. At a worksite, based on the Environment Management manual, we provide environmental education to our employees and specialized contractors. By sharing the cases that could result in an environmental accident, issuing notifications of the proper management of toxic substances such as asbestos and PCB, and reinforcing adequate control and treatment of polluted soil, we have been raising awareness of the importance of environment management and the prevention of environment-related accidents.

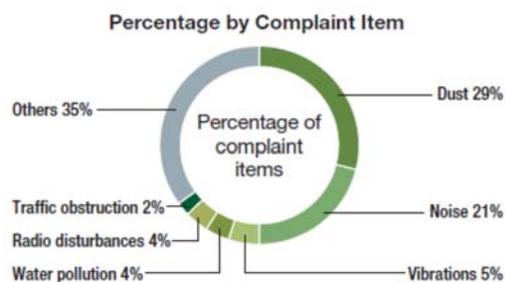
Regarding the management of water resources, Taisei Corporation is working to “prevent water pollution caused by construction wastewater, and the like” as a management priority. In FY2019, there were no water pollution caused by construction wastewater or violations of environmental laws.

Risk Measures at Worksites

Type	Measure (Example)
Dust	In response to a complaint about the dust generated by construction, we implemented measures such as water sprinkling and installing sheets.
Noise	In response to a complaint about the noise generated at the nighttime concrete-related work, we made early notification to the neighborhood.
Vibration	In response to a complaint about vibration caused by heavy machinery work in the factory, we changed our schedule to carry out work on factory holidays.
Water pollution	In response to fuel leaks from a crane barge, we used absorption mats for recovery and took recurrence prevention measures.

Complaint to Worksites and Handling Thereof

We take proper measures regarding environment-related complaints addressed to a workplace, make a record and report using a communication sheet based on an environment management system (EMS) procedure and share the information horizontally among concerned departments or within the entire Company as required. In addition, we are properly handling comments given by citizen groups.



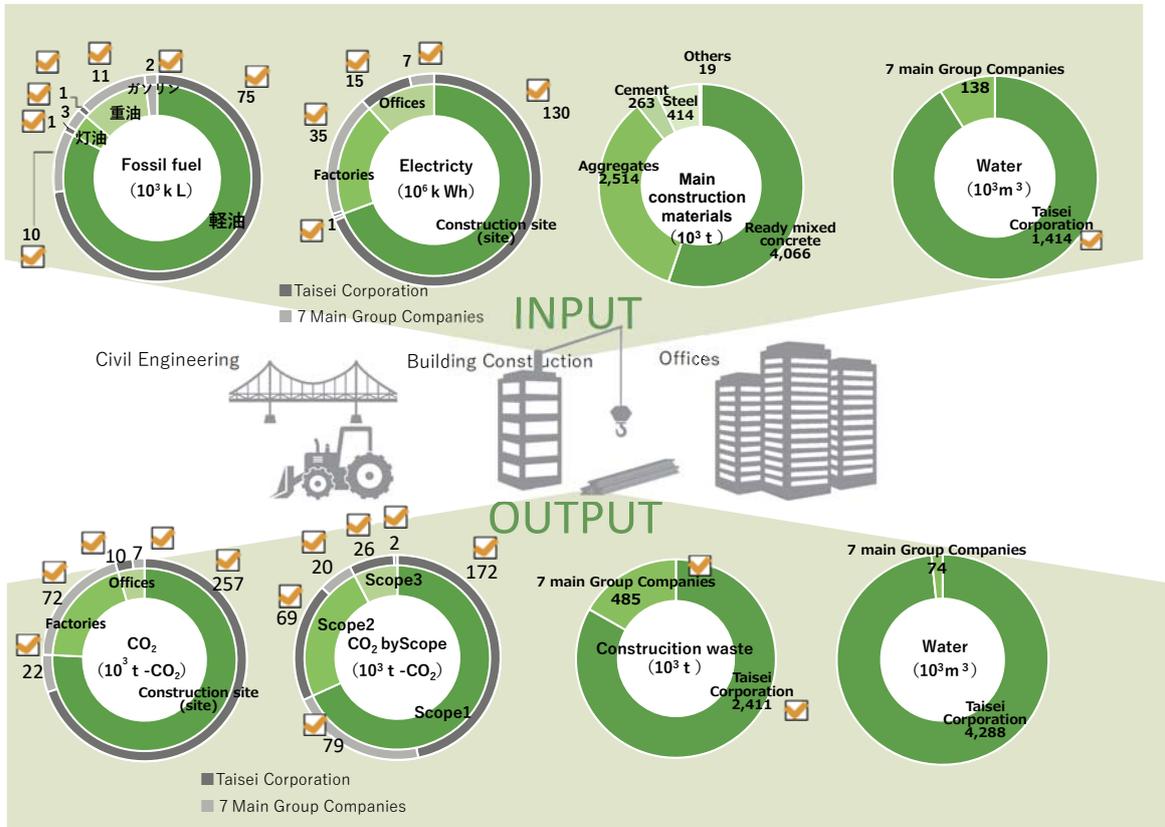
Technical Case Study

Developed a Cutting-Edge Method of Demolishing Skyscrapers Known as “Tecolep-Light system”

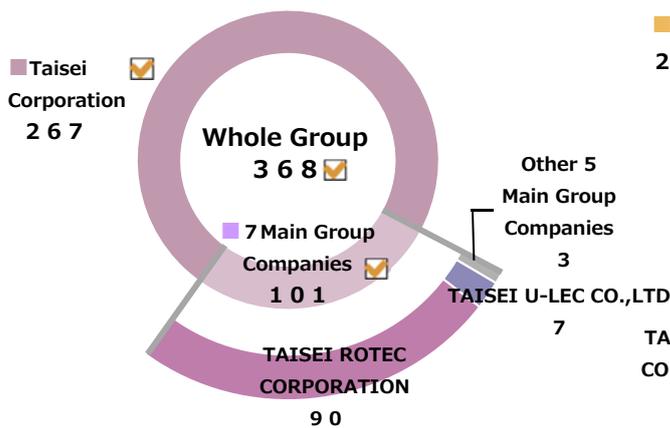
We successfully developed “Tecolep-Light system,” a cutting-edge method of demolishing skyscrapers. The Tecolep system is an environmentally-conscious method of demolishing skyscrapers by repeatedly jacking down from the upper level, while minimizing dust, noise, and other particles, etc. which may negatively affect the surrounding environment.

Unitized lightweight roof structures can reduce the time to create a closed space, allowing demolition work to be completed in a shorter period of time.

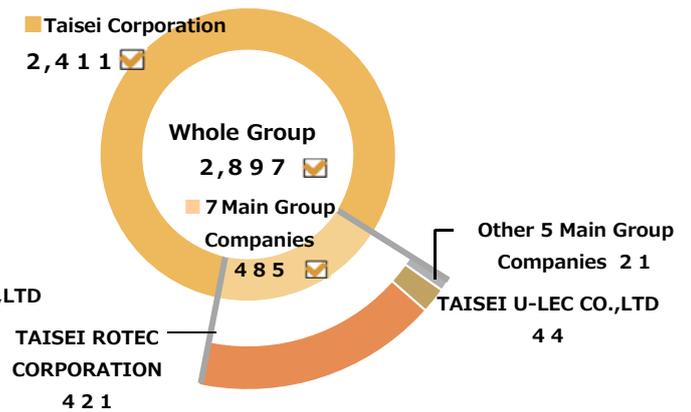
Material Flow



● CO2 Emissions of the Taisei Group (FY2019) Units : 10³t-CO₂



● Construction Waste Amount of the Taisei Group (FY2019) Units : 10³t



Material Flow

Taisei Corporation Material Flow

Third-party assured values (Independent assurance report) are indicated with the  mark

INPUT	Units	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Total energy use	10 ⁹ MJ	3.57	3.67	3.9	4.14	4.39 
Construction Site(building)	10 ⁹ MJ	1.4	1.61	1.72	1.61	1.99 
Construction Site(civil engineering)	10 ⁹ MJ	1.93	1.81	1.95	2.31	2.18 
Offices	10 ⁹ MJ	0.24	0.24	0.23	0.22	0.22 
Total fossil fuel use	10 ⁹ KL	58	61.9	68.9	79	76.7 
Diesel	10 ⁹ KL	57	60	66.3	77.8	75.2 
Kerosene	10 ⁹ KL	0.6	1.4	2	0.5	0.6 
Heavy oil	10 ⁹ KL	0.2	0.5	0.6	0.8	1.0 
Total electricity	10 ⁶ kWh	134	129	125	111	145 
Construction Site(building)	10 ⁶ kWh	33	35	49	43	57 
Construction Site(civil engineering)	10 ⁶ kWh	82	76	60	52	73 
Offices	10 ⁶ kWh	18	18	16	15	15 
City gas (offices)	10 ³ m ³	91	94	227	140	213 
Total quantity of the main construction materials(following 6 items)	10 ⁴ t	7,638	7,738	6,811	6,540	7,369 
Ready mixed concrete	10 ⁴ t	4,321	4,833	4,375	3,375	4,066
Aggregates(gravel, crushed stone, etc.)	10 ⁴ t	2,411	1,979	1,679	2,038	2,514
Cement	10 ⁴ t	190	262	283	695	263
Steel	10 ⁴ t	690	638	446	414	506
Timber	10 ⁴ t	21	15	24	16	16
Asphalt	10 ⁴ t	2	11	4	2	3
(of which the green procurement quantity)*	10 ⁴ t	1,152	681	995	1253	2,106
Total concrete formwork use	10 ³ m ²	3,473	3,042	4,082	3,464	2,931
Tropical plywood formwork	10 ³ m ²	2,514	1,801	2,850	1,883	1,920
Alternative formwork	10 ³ m ²	959	1,241	1,233	1,581	1,011
Alternative formwork percentage	%	27.6	40.8	30.2	45.6	34.5
Water (consumption)	10 ³ m ³	1,970	2,338	1,691	1,436	1,414 

OUTPUT	Units	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Total CO ₂ emissions	10 ³ t-CO ₂	226	231	245	261	267 
Construction Site(building)	10 ³ t-CO ₂	92	106	110	102	124 
Construction Site(civil engineering)	10 ³ t-CO ₂	122	113	124	148	133 
Offices	10 ³ t-CO ₂	12	12	11	11	10 
Total CO ₂ emissions	10 ³ t-CO ₂	226	231	245	261	267 
Scope 1	10 ³ t-CO ₂	128	138	151	179	172 
Scope 2	10 ³ t-CO ₂	76	71	67	57	69 
Scope 3	10 ³ t-CO ₂	22	22	27	25	26 
NO _x	t	989	1040	1151	1345	1302 
SO _x	t	148	158	175	205	200 
Quantity of Chlorofluorocarbon recovered	t	11	18	12	15	21 
Construction waste	10 ³ t	2284	2415	2644	2020	2411 
Quantity recycled and given intermediate processing	10 ³ t	2261	2320	2538	1924	2283
Quantity of direct final disposal(of which, asbestos quantity disposed)	10 ³ t	73	95	116	96	128
Water(discharged)	10 ³ m ³	3003	8172	4701	4483	4288

- * 1 The quantity used as green procurement products out of the main construction materials
- * 2 Until 2018, the amount of Freon and Halon collected by the company is recorded.

Material Flow for Group Companies

Material Flow for Group Companies

Third-party assured values (Independent assurance report) are indicated with the  mark

INPUT	Units	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	
Total energy use	10 ⁶ MJ	1.73	1.61	1.53	1.62	1.68	
Sites (construction sites)	10 ⁶ MJ	0.4	0.37	0.29	0.39	0.32	
Factories	10 ⁶ MJ	1.19	1.1	1.12	1.1	1.23	
Offices	10 ⁶ MJ	0.14	0.14	0.13	0.12	0.12	
Total fossil fuel use	10 ³ KL	30	27	25	26	26	
Diesel	10 ³ KL	12	11	9	12	10	
Kerosene	10 ³ KL	3	2	2	2	3	
Heavy oil	10 ³ KL	14	12	12	11	11	
Gasoline	10 ³ KL	2	2	2	2	2	
Total electricity use	10 ⁶ kWh	44	42	41	40	43	
Sites (construction sites)	10 ⁶ kWh	1	1	1	1	1	
Factories	10 ⁶ kWh	35	34	33	33	35	
Offices	10 ⁶ kWh	8	7	7	7	7	
City gas	10 ³ m ³	2888	3622	3794	4628	5,692	
LPG	t	58	92	63	378	485	
Water (consumption)	10 ⁷ m ³	137	132	153	115	138	

OUTPUT	Units	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	
Total CO ₂ emissions	10 ³ t-CO ₂	111	101	95	100	101	
Sites (construction sites)	10 ³ t-CO ₂	27	26	19	27	22	
Factories	10 ³ t-CO ₂	75	67	68	66	72	
Offices	10 ³ t-CO ₂	8	8	7	7	7	
Total CO ₂ emissions	10 ³ t-CO ₂	-	101	95	100	101	
Scope1	10 ³ t-CO ₂	-	77	73	79	79	
Scope2	10 ³ t-CO ₂	-	23	21	20	20	
Scope3	10 ³ t-CO ₂	-	2	1	1	2	
NO _x	t	277	249	211	257	227	
SO _x	t	128	109	106	107	103	
Quantity of Chlorofluorocarbon and halon recovered	t	2	2	2	3	2	
Total industrial waste emissions	10 ³ t	391	352	259	266	485	
Quantity recycled	10 ³ t	365	333	248	256	475	
Final disposal quantity	10 ³ t	26	19	11	10	10	
Water (quantity discharged)	10 ⁷ m ³	137	121	143	109	74	

Third-party Assurance of Environmental Data within the Taisei Group

Over the past five years, we have standardized and manualized the method of collecting and aggregating environmental data such as the quantity of energy consumed, the quantity of CO₂ emissions and the volume of industrial waste for the 7 main group companies participating in the Taisei Group Environmental Promotion Conference. In FY2018, continuing from the previous year, the 7 main group companies received third-party assurance for their actual performance data.

Among the group companies, TAISEI ROTEC CORPORATION, TAISEI U-LEC CO., LTD., TAISEI SETSUBI CO., LTD. and J-FAST Co., Ltd. were inspected by auditors visiting their head offices, major offices and factories.

Third-party assurance not only guarantees the data reliability but also leads to a review and improvement of the management structure and initiatives of each group company.

•Data is rounded off; therefore, the total value may not equal the sum of the parts.

Calculation Standard for Material Flow Data

Objective	Items	Calculation Method & Standard
Material flow-related	Classification by business type	Classification into civil engineering and building construction (sites), offices (excluding development projects and others), and factories
	CO ₂ emissions Scope classification	Scope 1: CO ₂ emissions associated with the combustion of fossil fuels Scope 2: Indirect CO ₂ emissions associated with the use of electricity, steam, and chilled and hot water Scope 3: CO ₂ emissions associated with the transport of construction waste off construction sites and the outward and return transport of soil from construction (off-site emissions)
	CO ₂ emissions	Calculation standard Calculated based on in-house standards and the Taisei Group's environmental data calculation manual for the management of environmental information, complying with the Act on the Rational Use of Energy, the Act on Promotion of Global Warming Measures, the Waste Disposal and Public Cleansing Act, and the GHG Protocol, etc. In calculation of CO ₂ emissions, Taisei Corporation uses the value of the fuel consumption of the Japan Construction Mechanization Association, from which the fat content is excluded.
	NOx and SOx emissions	Calculation of NOx and SOx emissions originating from diesel, heavy oil, and kerosene. Calculated using the emission coefficient of the Architectural Institute of Japan's "Guide to Building LCA - Evaluation Tool for Measures against Global Warming, Resource Consumption, and Waste - Revised Version."
	[Offices and Factories] Energy-related and water consumption	Calculation standard Calculated based on in-house standards and the Taisei Group's environmental data calculation manual for the management of environmental information, complying with the Act on the Rational Use of Energy, the Act on Promotion of Global Warming Measures, and the GHG Protocol, etc. - Energy-related and water consumption - Offices and factories: The annual quantities purchased and used are calculated in monthly units. * Energy-related: Fossil fuels (heavy oil, diesel, gasoline, kerosene), electrical power, city gas, and LPG consumption and their energy-equivalent values.
	[Civil Engineering and Building Construction (sites)] Energy-related and water consumption	Calculation standard Calculated based on in-house standards and the Taisei Group's environmental data calculation manual for the management of environmental information, complying with the Act on the Rational Use of Energy, the Act on Promotion of Global Warming Measures, and the GHG Protocol, etc. - Energy-related and water consumption - Civil Engineering and Building Construction (sites): Consumption in a two-month period in FY2019 is sampled at 178 construction sites to calculate the consumption per unit of construction turnover (basic unit). Annual consumption is calculated by multiplying this basic unit by the construction turnover for the year. For civil engineering, this calculation is performed for each construction type. * Energy-related: Fossil fuels (heavy oil, diesel, gasoline, kerosene), electrical power, city gas, and LPG consumption and their energy-equivalent values.
	[Civil Engineering and Building Construction (sites)] Calculation of the main construction materials and other materials (concrete formworks and alternative formworks) purchased	- Amount of the main construction materials and other materials used: The quantities of the main construction materials and other materials purchased directly through individual construction of Taisei Corporation and joint venture construction for which Taisei Corporation is the representative.
	[Civil Engineering and Building Construction (sites)] Calculation of chlorofluorocarbons recovered	Amount of chlorofluorocarbons recovered that were emitted by Taisei Corporation
Prevention of global warming	[Civil Engineering, Building Construction (sites), and Factories] Calculation of construction and industrial waste emissions	Construction by-products (waste and valuable resources) emitted at the sites of individual construction projects, joint venture construction for which Taisei Group is the representative, and factories owned by Taisei Group.
	Estimated CO ₂ emissions and CO ₂ reduction rate in the operation stage Calculated value based on the FY1990 standard Emissions per unit floor area	Calculated using the "Energy Efficiency Plan" for each of 55 projects, each with a total floor area of 300 m ² or more and with a total area of about 660,000 m ² , of Taisei Corporation building construction projects. - Energy Efficiency Plan: A plan that summarizes the measures for the efficient use of energy such as building thermal insulation, air conditioning facilities, etc., which is required to be submitted when designing buildings with a total floor area of 300 m ² or more in accordance with the Act on the Rational Use of Energy.
Resource recycling	Results for adoption of green procurement items	Calculated the quantities based on the design specifications by Eco Sheet CASBEE introduced to buildings designed by Taisei Corporation
	Recycled amount	Total amount of sale of valuable resources, wide-area certification, self-disposal, and intermediate treatment
	Final disposal amount	Total amount of direct final disposal and intermediate processing residue
	Final disposal rate	(final disposal amount / amount arising) × 100 (excluding construction sludge and amount not attributable to Taisei Corporation)

- Organizations covered: the Taisei Group (Taisei Corporation, TAISEI ROTEC CORPORATION, Taisei-Yuraku Real Estate Co., Ltd., TAISEI U-LEC CO., LTD., TAISEI SETSUBI CO., LTD., TAISEI HOUSING CORPORATION, SEIWA RENEWAL WORKS CO., LTD., and J-FAST Co., Ltd.), which are all within Japan only. Environmental data cover more than 90% of the sales made by the entire Taisei Group.

- Calculation standard: Calculated based on in-house standards and the Taisei Group's environmental data calculation manual for the management of environmental information, complying with the Act on the Rational Use of Energy, the Act on Promotion of Global Warming Measures, the Waste Disposal and Public Cleansing Act, and the GHG Protocol, etc. In calculation of CO₂ emissions, Taisei Corporation uses the value of the fuel consumption of the Japan Construction Mechanization Association, from which the fat content is excluded. Energy-related: Fossil fuels (heavy oil, diesel, gasoline, kerosene), electrical power, city gas, and LPG consumption and their energy-equivalent values.

- Energy Efficiency Plan: A plan that summarizes the measures for the efficient use of energy such as building thermal insulation, air conditioning facilities, etc., which is required to be submitted when designing buildings with a total floor area of 300 m² or more in accordance with the Act on the Rational Use of Energy.

Independent Assurance Report



Translation

The following is an English translation of an independent assurance report prepared in Japanese and is for information and reference purposes only. In the event of a discrepancy between the Japanese and English versions, the Japanese version will prevail.

Independent Assurance Report

September 30, 2020

TO:

Mr. Yoshiro Aikawa
President and Chief Executive Officer,
Representative Director
Taisei Corporation

Kenji Sawami
Engagement Partner
Ernst & Young ShinNihon LLC

We, Ernst & Young ShinNihon LLC., have been commissioned by Taisei Corporation (hereafter the "Company") and have carried out a limited assurance engagement on the Key Environmental Performance Indicators (hereafter the "Indicators") of the Company, TAISEI ROTEC CORPORATION*, TAISEI U-LEC CO.,LTD*, Taisei-Yuraku Real Estate Co.,Ltd.*, TAISEI SETSUBI CO.,LTD., TAISEI HOUSING CORPORATION*, SEIWA RENEWAL WORKS CO.,LTD* and J-FAST Co., Ltd.* for the year ended March 31, 2020 as included in "Sustainability Activities (By Core Subjects of ISO 26000) The Environment" on the Company's website (hereafter the "Report"). The scope of our assurance procedures was limited to the Indicators marked with the symbol "✓" in the Report.

1. The Company's Responsibilities

The Company is responsible for preparing the Indicators in accordance with the Company's own criteria, which it determined with consideration of Japanese environmental regulations as presented in the Report. Greenhouse gas (GHG) emissions are estimated using emissions factors, which are subject to scientific and estimation uncertainties given instruments for measuring GHG emissions may vary in characteristics, in terms of functions and assumed parameters.

2. Our Independence and Quality Control

We have met the independence requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is based on the fundamental principles of integrity, objectiveness, professional competence and due care, confidentiality, and professional behavior. In addition, we maintain a comprehensive quality control system, including documented policies and procedures for compliance with ethical rules, professional standards, and applicable laws and regulations in accordance with the International Standard on Quality Control 1 issued by the International Auditing and Assurance Standards Board.

3. Our Responsibilities

Our responsibility is to express a limited assurance conclusion on the Indicators included in the Report based on the procedures we have performed and the evidence we have obtained.

We conducted our limited assurance engagement in accordance with the *International Standard on Assurance Engagements: Assurance Engagements Other than Audits or Reviews of Historical Financial Information* ("ISAE 3000") (Revised) and, with respect to GHG emissions, the *International Standard on Assurance Engagements: Assurance Engagements on Greenhouse Gas Statements* ("ISAE 3410"), issued by the International Auditing and Assurance Standards Board.

The procedures, which we have performed according to our professional judgment, include inquiries, document inspection, analytical procedures, reconciliation between source documents and Indicators in the Report, and the following:

- Making inquiries regarding the Company's own criteria that it determined with consideration of Japanese environmental regulations, and evaluating the appropriateness thereof;
- Inspecting relevant documents with regard to the design of the Company's internal controls related to the Indicators, and inquiring of personnel responsible thereof at the headquarter and sites visited (1 construction site, 1 office and 3 factories);
- Performing analytical procedures concerning the Indicators at the headquarter and sites visited (1 construction site, 1 office and 3 factories);
- Testing, on a sample basis, underlying source information and conducting relevant re-calculations at the headquarter and sites visited (1 construction site, 1 office and 3 factories);

The procedures performed in a limited assurance engagement are more limited in nature, timing and extent than a reasonable assurance engagement.

As a result, the level of assurance obtained in a limited assurance engagement is lower than would have been obtained if we had performed a reasonable assurance engagement.

4. Conclusion

Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the Indicators included in the Report have not been measured and reported in accordance with the Company's own criteria that it determined with consideration of Japanese environmental regulations.

* CO₂ emissions, energy use, fossil fuel use, electricity use, city gas, LPG, industrial waste emissions only