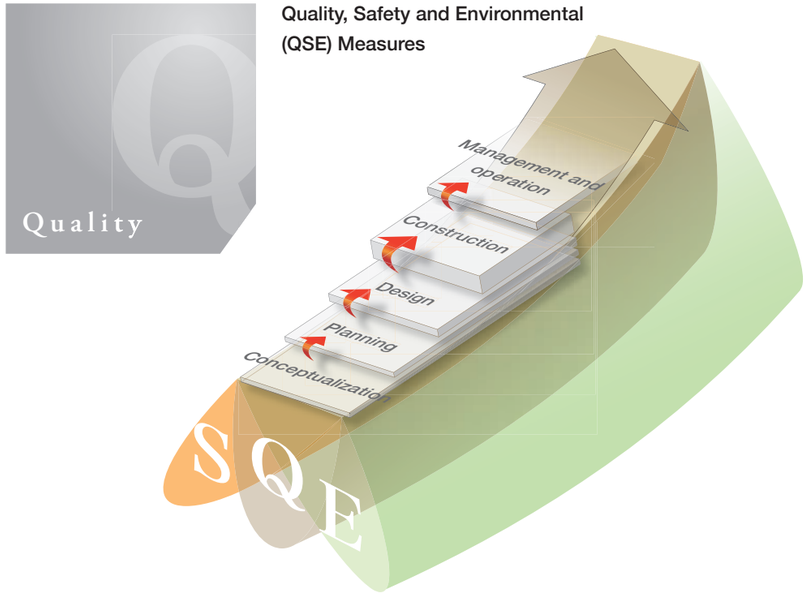
Construction Operations: Three Key Tasks

In April 2003, Kajima integrated several separate policies on quality, safety and health, and the environment. Then, the Company introduced management systems based on the new common policy to its construction business, both in civil engineering and building construction. Since quality, safety, and the environment are all interconnected, improving one area yields synergies in the others. Kajima incorporates these three perspectives into construction plans and daily operations at each site.



Quality, Safety and Environmental (QSE) Measures

Kajima's long track record of delivering reliable quality has earned trust and appreciation, creating, in turn, opportunities for new projects. In response to a number of quality issues in recent years, Kajima has re-examined its methods, and launched an all-out effort to ensure total dedication to quality assurance, which is the foundation of clients' trust. The slogan for this effort is, "Building with the Heart and Soul of a Craftsman."

Management Systems

Kajima performs quality management in accordance with the ISO 9001 certification obtained by both its civil engineering and building construction businesses. The certification covers quality management at relevant Head Office departments, the Kajima Technical Research Institute, the Architectural Design Division, and branch offices. Group companies outside Japan have also obtained certification when appropriate. The two businesses have both prepared manuals and implementation guidelines under the quality management system.

Quality Assurance, Safety and Health, and Environmental Policies

Basic Policy

Quality assurance, safety and health, and environmental management are fundamental to production and corporate survival. By establishing and continuously improving management systems to comply with relevant laws, ordinances, and other societal requirements, Kajima works to produce efficiently while earning the trust of clients and society.

Quality Assurance Policy

Kajima provides products and services that satisfy clients, from marketing to follow-up services, allowing them to place orders with a sense of reassurance and trust.

1 We ensure product quality by heeding and addressing client requirements and responding while thoroughly implementing the plan-do-check-act cycle.
2 We enhance research and development and plan ways to improve quality and increase operational efficiency.

Safety and Health Policy

Safety is the barometer of a company's capabilities and ethics. We therefore collaborate with subcontractors with strong management to eliminate construction-related accidents and injuries so we can maintain public trust in the construction industry while pursuing sustainable corporate progress.

1 We work to prevent accidents and incidents stemming from human error by focusing on the workplace, equipment, and site conditions and by using point-call-and-response practices as routine workplace procedures.
2 We strive to create safe and comfortable working environments by facilitating close communication between Kajima and partner companies and by ensuring close coordination between people, machinery, and equipment.

Environmental Policy

Kajima, as the company "Building for the Next 100 Years," pursues a unique long-term environmental vision, doing its part in the broader social efforts to preserve the environment and ensure economic sustainability.

1 We work to reduce the environmental impact of our business and take into consideration the entire lifecycle of the structures we construct. We thereby seek to help build societies which use materials responsibly, have a low carbon footprint, and harmonize with nature.
2 As a standard for achieving these goals, Kajima:
- Creates innovative technologies that help safeguard the environment and use resources sustainably.
- Engages in construction management processes to prevent environmental damage caused by hazardous materials used in construction projects.
- Cooperates with the public, including by proactively disclosing information.

Performance in Fiscal 2015

In each of its civil engineering projects, Kajima makes it a priority to ensure the quality of concrete and eliminate quality issues in piles. Manuals have been prepared to ensure these issues get priority management. While expanding training programs for improving technical capabilities, Kajima is also focusing on research and technology development to further promote quality assurance.

In the building construction business, Kajima operates according to the Guidelines for Managing and Supervising Construction Work. The aim is to develop dynamic quality management activities and keep improving their effectiveness, while focusing on items that need to be recorded at construction sites as well as inspection methods as part of quality management by the builder. There is a very diverse range of specialized jobs in building construction. Since multiple jobs are being performed at the same time, Kajima executes thorough process management for each job, including the installation of rebar, piles, concrete and waterproofing.

In order to ensure quality, it is essential that the awareness of each employee is consistent with that of the Head Office, branch office, and construction site organizations, as well as each committee.

From the time a property owner gives the go-ahead until the start of construction, and during the construction process, the earlier that construction planning can be carried out from the macro to micro levels, the better results can be achieved for quality, cost, delivery time, safety, and the environment (QCDSE). As part of construction planning, specialists in procurement as well as mechanical and electrical engineering provide their input at consultations such as construction preparation committee meetings. The planning framework allows Kajima to utilize the expertise it has gained through numerous projects over the years.

Verification is also provided at the testing facilities of the Kajima Technical Research Institute, using simulations based on the particular conditions at the site concerned. This technical support for its construction sites is part of the comprehensive strength Kajima offers.

Safety

Kajima has a responsibility to everyone at its construction sites to ensure proper safety and health management. As the prime contractor, Kajima must perform planning and risk management so that the supervisors and workers of subcontractors at Kajima sites are able to work with peace of mind, using safe equipment in a safe environment.

At construction sites in Japan in fiscal 2015, Kajima experienced 83 accidents resulting in four or more lost workdays, including 3 fatal accidents. The frequency rate of industrial injuries resulting in four or more lost workdays was 0.80, and the rate for injuries resulting in one to three lost workdays was 1.37. The severity rate of industrial injuries was 0.28. Kajima is working hard to ensure that everyone on site puts safety first, redoubling its efforts under the slogan, “Think Safety! Make Today Accident Free!”

Changes in Safety Results

		2011	2012	2013	2014	2015
Accident frequency rate	(at least 4 days off work)	0.82	0.76	0.77	0.93	0.80
	(at least 1 day off work)	—	1.73	1.67	1.99	1.37
Accident severity rate		0.58	0.40	0.10	0.16	0.28
No. of accidents		89	85	80	102	83
No. of fatalities		8	5	1	2	3
Cumulative working hours (millions of hours)		108.19	112.16	104.51	109.32	104.25

Frequency rate: The number of fatalities and injuries at worksites per one million cumulative working hours
Severity rate: The severity of illnesses and injuries represented by the number of workdays lost over one thousand cumulative working hours

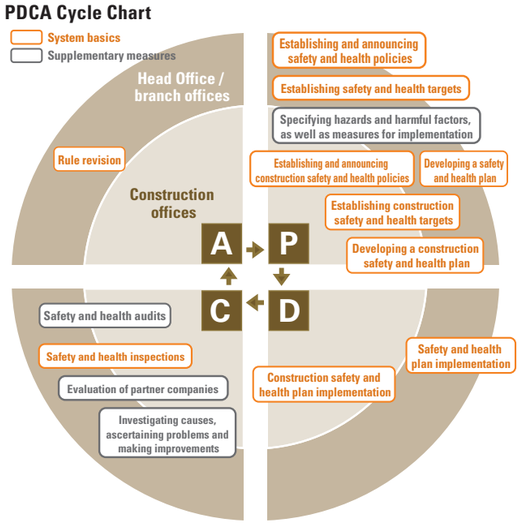
Kajima receives an award for excellence from Japan’s Minister for Health, Labour and Welfare, recognizing it for model workplaces with a high level of safety and health.

Management System

Kajima performs safety and health management in accordance with the Construction Occupational Health and Safety Management System (COHSMS) established by the Japan Construction Occupational Safety and Health Association.

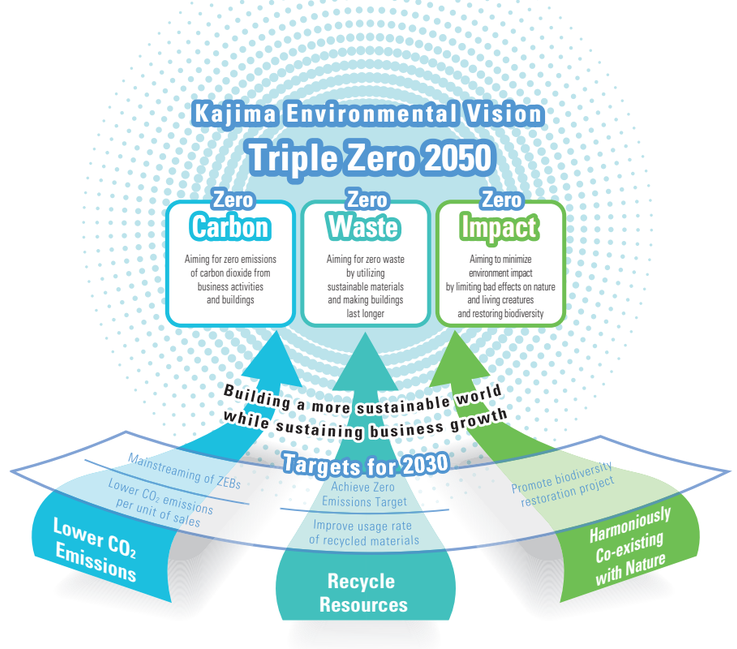
Kajima reviews its safety and health policies as needed based on the current situation and the previous year’s results. It then develops company-wide safety and health targets and plans for the coming fiscal year. This plan-do-check-act (PDCA) cycle is used to identify priority measures for implementation at each construction office, at supporting branch offices and the Head Office, and at partner companies. With this foundation, each Kajima construction site sets safety and health policies, targets and plans, which are implemented with partner companies during construction. Moreover, regular safety patrols are carried out at construction sites in order to constantly improve the safety and health level.

PDCA Cycle Chart



President Yoshikazu Oshimi marks National Safety Week by going on a safety patrol and addressing employees at a morning assembly.

Environment



The construction industry has a substantial impact on the future by creating social infrastructure. As the company “Building for the Next 100 Years,” Kajima strives to lead the way in the effort to build a more sustainable world. The Kajima Environmental Vision, “Triple Zero 2050,” is Kajima’s roadmap for doing its part.

Triple Zero 2050 aims for both environmental and business sustainability, focusing on three essential activities: reducing carbon emissions, recycling resources, and harmoniously co-existing with nature. This means targeting zero carbon emissions, waste, and environmental impact from operations. This not only minimizes risk for Kajima by reducing its environmental impact, but also creates new business opportunities as the Company proposes new environmental technologies to clients and the broader society. It identifies the core activities needed and includes interim quantitative targets for 2030 for each design and construction stage.

To reduce CO_2 emissions, most of which occur at the use phase of a building’s life cycle, Kajima is developing zero-energy building (ZEB) technologies and using its facilities to test them. As for construction-phase CO_2 emissions, Kajima is working to reduce emissions by making more efficient use of building materials, increasing the efficiency of operations, and reducing fuel consumption. On the recycling front, Kajima is seeking to improve the quality of its recycling operations by utilizing recycling programs that allow manufacturers recognized by Japan’s Minister of the Environment to collect their own used products. In addition, to help build societies that harmoniously co-exist with nature, Kajima uses its business activities to provide green infrastructure by pursuing land use and facility development that makes the most of the power of nature. Kajima Biophilic Cities, a leading initiative in this area, are designed to foster healthy urban ecosystems.

While reducing carbon emissions, waste, and environmental impact from operations under Triple Zero 2050, Kajima is also strengthening the foundation for achieving the vision by giving special attention to management of hazardous substances, research and technology development, and dissemination of information in and outside the Company.

	Social goals	Triple Zero 2050	Targets for 2030	
Building a More Sustainable World	**Lower CO_2 Emissions** Balancing greenhouse gas emissions from human activities with the Earth’s capacity for CO_2 absorption	**Zero Carbon** Aiming for zero emissions of CO_2 and other greenhouse gases, not only from the Company’s business activities, but also from the buildings it constructs	**Design Operations** Realize zero-energy buildings (ZEBs) by 2020, standardize ZEB techniques by 2025, and promote their mainstreaming by 2030. **Construction Operations** Lower CO_2 emissions per unit of sales to 35%[1] of 1990 level	Common Foundation Initiative Areas • Management of hazardous substances: Ensure preventative measures (especially for soil contamination and asbestos) and proper management of chemical substances • Perform research and technology development • Actively distribute information in and outside the Company
	Recycle Resources Pursuing zero emissions by employing state-of-the-art infrastructure maintained and operated using sustainable resources	**Zero Waste** Aiming to eliminate waste from construction operations by ensuring zero landfill disposal of waste during construction, utilizing sustainable materials, and making buildings last longer	• Completely eliminate final landfill waste disposed from construction operations • Achieve a usage rate of recycled materials of at least 60% for principal construction materials.[2]	
	Harmoniously Co-existing with Nature Valuing the continuous benefits of ecosystem services by minimizing the impact of human activities on the environment and living creatures	**Zero Impact** Aiming to minimize the overall environmental impact of construction operations by limiting their effect on nature and living creatures while promoting the restoration of biodiversity and new ways to make use of its benefits	• Promote biodiversity restoration projects • Build up effective projects and make them hubs for biodiversity-related networking	

1. Equivalent to a 65% reduction of total emissions.
2. Principal construction materials are steel, cement, concrete, crushed stone, and asphalt.

Summary of 2015, and Future Initiatives

Fiscal 2015 was the first year of the new medium-term environmental plan. Construction-phase CO_2 emissions per unit of sales were 16.5% lower than in fiscal 1990, better than the target of a 15% reduction. Use-phase CO_2 emissions at Kajima buildings were down by 25.5%, since the same base year, falling short of the initial target of 35% which was set under Japan's revised Act on the Rational Use of Energy. The final disposal rate came in at 3.1%, just over the target, which was to keep it below 3%.

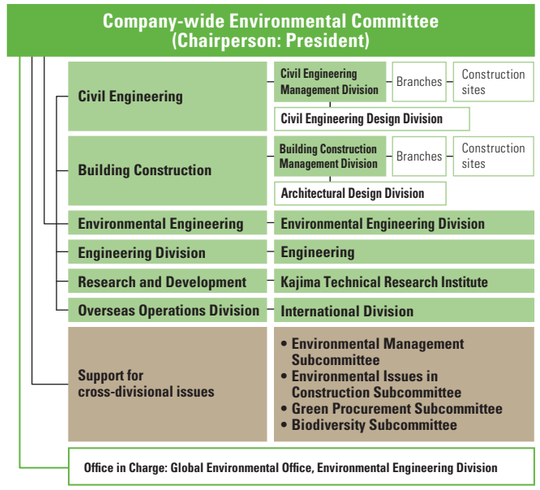
In the new medium-term environmental plan, Kajima took on the additional goal of "reduce construction sludge and promote its effective use." With this goal in mind, the Group has looked all over Japan to find best practices for handling sludge. In addition, Kajima took part in a project to use improved construction sludge after intermediate treatment. This project was implemented by the Japan Federation of Construction Contractors and was adopted by the Tokyo Metropolitan Government's Bureau of Environment as a model project. The project proved that improved construction sludge makes excellent backfill material. In the future, this project will be cited when Kajima seeks the understanding and acceptance of project owners and designers as it works to promote the use of improved construction sludge.

Management of hazardous substances has been identified by Kajima as one of its "common foundation initiative areas." Thanks to ample support extended by the Head Office and branch offices to construction sites regarding asbestos management and other challenges, no major problems have occurred. In waste management operations, however, there was a case in which the improper disposal of leftover ready-mixed concrete was discovered in fiscal 2014. In 2016, the case, not only against an employee but also against Kajima itself due to legal provisions regarding joint liability, was sent to the prosecutor's office. Kajima is very serious about the need to put a stop to such improprieties, and in fiscal 2015 launched environmental training activities at all branch offices for employees involved in construction.

To maintain compliance with the ISO 14001 environmental management system standards as revised in September 2015, Kajima is making preparations to switch to the new standards, starting April 1, 2017. In line with the principle of "integrating environmental concerns and operations," the Company began implementing the new requirements on a trial basis in 2015 with respect to risks and opportunities. The results have been reflected in the setting of business targets.

In April 2016, the Japan Federation of Construction Contractors issued version 6 of its Voluntary Environmental Action Plan for the Construction Industry. Kajima and other firms in the industry are working together to achieve the goals of lowering CO_2 emissions, recycling resources, and harmoniously co-existing with nature.

Environmental Management System (EMS) Structure



FY2015 Environmental Targets and Actual Accomplishments

	Medium-Term Environmental Plan(2015-2017)	FY2015 target	Results	Evaluation
Lower CO_2 Emissions	Design: Enhance and improve efforts to respond to enforcement of the revised Act on Rational Use of Energy in fiscal 2015	Design:Reduce CO_2 emissions by at least 35% compared to the fiscal 1990 level in the use phase of design-build contracts.	25.5%	△
	Construction: Reduce CO_2 emissions per unit of sales during construction by 17% compared to the fiscal 1990 level	Construction: Reduce CO_2 emissions per unit of sales during construction by 15% compared to the fiscal 1990 level	16.5%	○
Recycle Resources	Achieve final disposal rate of less than 3%	• Achieve final disposal rate of less than 3% • Reduce construction sludge and promote its effective use	3.1%	△
	Promote green procurement at the design phase: Out of 17 standard construction materials/supplies, propose at least 4 to clients in each design Promote longer service life for buildings	• Promote green procurement at the design phase: Out of 17 standard construction materials/supplies, propose at least 4 to clients in each design • Promote longer service life for buildings: Attain a score of at least 3.6 for evaluations based on in-house check sheet	• Green procurement rate: 87%; Average number of items proposed: 5.2 • Average score: 3.72	○
Harmoniously Coexisting with Nature	Implement 6 or more outstanding biodiversity projects per year	Implement 6 or more outstanding biodiversity projects	5 projects	△
Common Foundation Initiative Areas	Manage hazardous substances Implement preventative measures (especially for soil contamination and asbestos)	Manage hazardous substances Implement preventative measures (especially for soil contamination and asbestos)	3 environmental incidents (including those involving waste)	×
	Manage chemical substances	Manage chemical substances	Performed risk assessment based on an environmental checklist (design/construction)	○

Evaluation: ○ Target met △ Target nearly achieved × Target not met

Material Flow

INPUT

Project sites	Diesel oil	75,700 kℓ
	Kerosene	1,831 kℓ
	Electricity	105,740,000 kWh
	Construction materials	2,191,000 t
	Water	1,417,000 m³
Office	Electricity	25,410,000 kWh
	Heavy Oil	9.5 kℓ
	Kerosene	11.8 kℓ
	Gas	165,000 m³
	Water	140,000 m³

OUTPUT

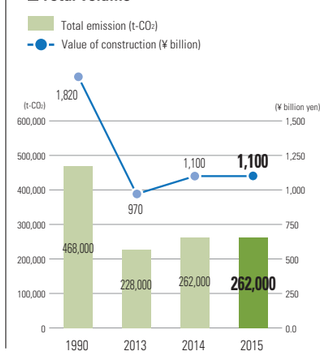
CO_2 emissions (construction)	262,000 t
Construction surplus soil	981,000 m³
Hazardous materials	
Materials containing asbestos	21,329.2 t
CFCs and halon received	3.4 t
Fluorescent tubes	48.1 t
Construction waste	2,486,000 t
Final disposal volume	161,000 t
CO_2 emissions	15,000 t
Volume of waste	1,389.6 t

CO_2 Emissions Attributable to Construction

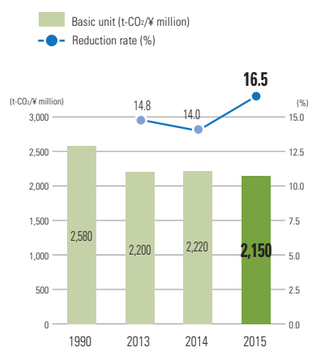
Since fiscal 2014, Kajima has calculated CO2 emissions using a power-receiving coefficient instead of a power-generation coefficient. Past data for CO2 emissions has been modified accordingly.

*1 Basic unit is a weighted average of basic units of civil engineering and building construction and a rate of construction value (a moving average for three years).

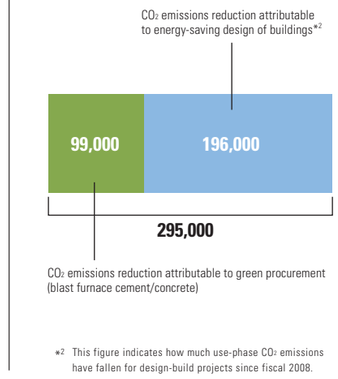
■ Total volume



■ Basic unit*1

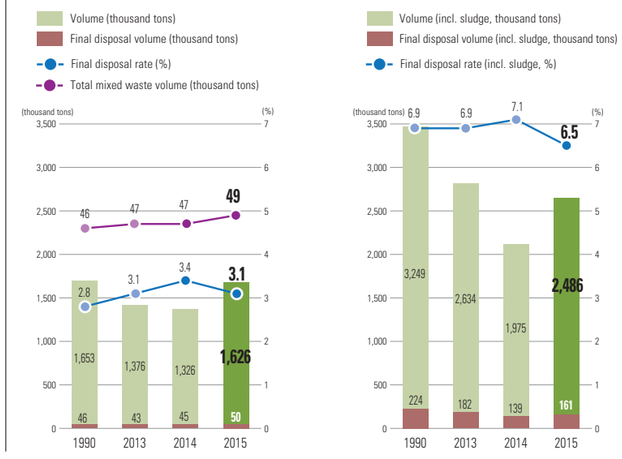


Indirect Reduction (t-CO_2)

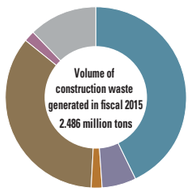


*2 This figure indicates how much use-phase CO_2 emissions have fallen for design-build projects since fiscal 2008.

Volume of Construction Waste and Final Disposal Volume

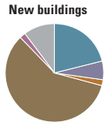


Emissions by Waste Category



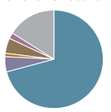
1	Concrete remnants	43%
2	Asphalt concrete remnants	6%
3	Wood scrap	2%
4	Construction sludge	35%
5	Mixed waste	2%
6	Others	12%

New buildings



1	22%	4	58%
2	6%	5	2%
3	2%	6	10%

Demolish & rebuild



1	71%	4	5%
2	5%	5	2%
3	1%	6	16%