

<With the planet>

Addressing global environmental issues

Komatsu established the Komatsu earth environment charter (currently known as the Komatsu earth and environment policy) in 1992. We consider environmental conservation activities as one of top management priorities, launching proactive initiatives to address climate change and other environmental issues. Recognizing the potential impact of our business activities not only on climate change, but also on our ecosystem, we take steps to maintain our commitment to protect biodiversity. With the establishment of Komatsu declaration on biodiversity in January 2011, Komatsu business units worldwide began activities designed to preserve biodiversity. We continue to pursue ongoing efforts to reduce the environmental impact of our business activities. Komatsu also considers biodiversity when deciding how to use land, such as when building plants. Komatsu is directly involved in the preservation of biodiversity, and, at the same time, we expand one-site, one-theme activities to preserve local ecosystems and conduct restoration activities at former mine sites. To develop a prosperous and comfortable society, as well as to pass on the irreplaceable global environment in a healthy state to the next generation, Komatsu continues to work for environmental conservation by advanced technologies across all business activities. We also contribute to sustainable development by reducing CO₂ emissions from our manufacturing and products, as well as by working to build a recycling-oriented society. Our aim is to achieve carbon neutrality by 2050, reducing CO₂ emissions to net zero.

Web [Komatsu earth and environment policy \(ESG Databook\)](#)

Web [Komatsu declaration on biodiversity \(ESG Databook\)](#)

Climate change initiatives (Disclosure based on TCFD recommendations)

In April 2019, Komatsu announced our endorsement of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). We advance climate change response measures through climate change risk and opportunity assessments and scenario analyses based on these recommendations, as well as through healthy dialogue with stakeholders.

At the 26th United Nations Climate Change Conference held in the United Kingdom (COP26) in November 2021, an agreement was reached to work toward limiting the average rise in global temperatures to 1.5°C above pre-industrial levels. At COP28, held in November-December 2023, it was agreed to accelerate emission reductions to achieve the 1.5°C target.

Komatsu previously conducted scenario analyses based on scenarios projecting average rises of 2°C or 4°C. However, in light of these global trends and following discussions by the Sustainability Promotion Committee, discussions by the Strategy Review Committee, and reports submitted to the Board of Directors, we decided that the Company would also perform analyses of a scenario projecting a rise of 1.5°C beginning in FY2022. We disclose the results of these analyses annually.



(1) Governance

The Komatsu Group views climate change as an important management issue. We set, and targets for combating climate change, which are discussed by each committee. We incorporate these targets in our business strategies. The roles and discussions of each committee are disclosed in this report under Sustainability Management.

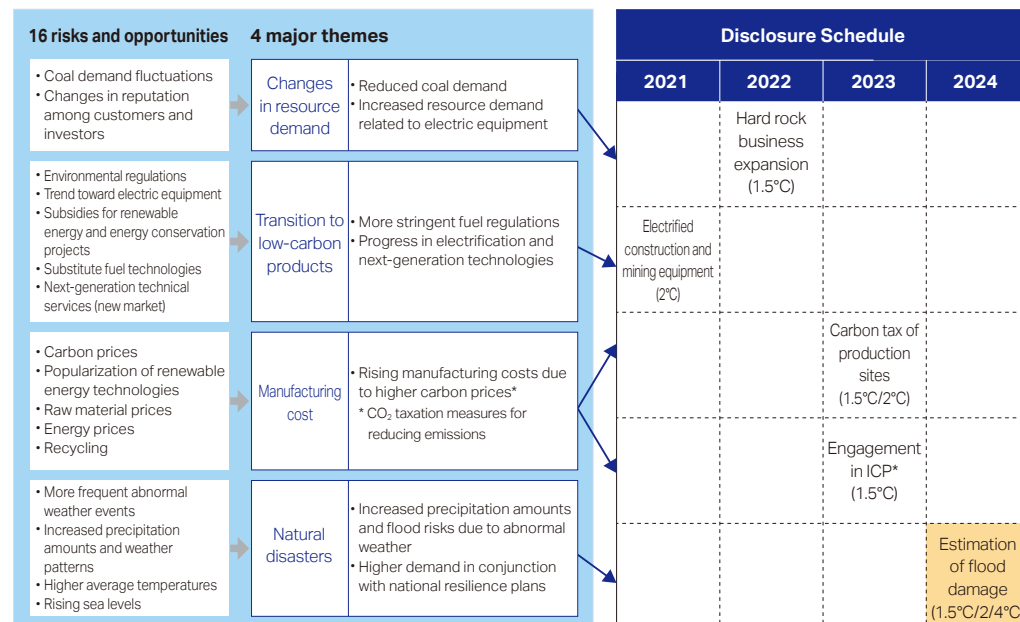
P.45 Sustainability management

(2) Strategies

1) Risk and opportunity identification

In identifying climate change-related risks and opportunities pertaining to the Komatsu Group's business, we referenced the risk and opportunity examples described in Final Report: TCFD recommendations to determine 16 risks and opportunities with the potential to impact the construction and mining equipment business. We then assessed the internal and external factors predicted under the chosen scenarios that may impact earnings, group the identified risks and opportunities into the four major themes below. Since our first TCFD disclosure in 2020, we have focused on these four themes and updated them annually. The themes we have disclosed based on our scenario analysis to date are as follows.

Figure: Risks and opportunities and major themes



*Internal carbon pricing

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2) Assumptions for scenario analysis

To gauge the potential impacts of climate change-related risks and opportunities on the Komatsu Group's business, we performed scenario analyses of the aforementioned four major risk and opportunity themes. For these scenario analyses, we selected the 1.5°C scenario, the 2°C scenario, and the 4°C scenario based on the Fifth Assessment Report (Representative Concentration Pathways 2.6 and 8.5) and the Sixth Assessment Report (Shared Socioeconomic Pathways 5-8.5) of the Intergovernmental Panel on Climate Change. We also used the Sustainable Development Scenario, the Stated Policies Scenario, and the Net Zero by 2050 scenario of the International Energy Agency (IEA).

The risks and opportunities associated with changes in resource demand, the transition to low-carbon products, and manufacturing costs were the greatest under the 1.5°C and 2°C scenarios, whereas the risks and opportunities associated with natural disasters were the greatest under the 4°C scenario. Below, we provide information on the risks and opportunities related to each of the four major themes, as well as Komatsu's response to these risks and opportunities.

3) The four major themes

3)-1. Changes in resource demand

Risks	Opportunities
<ul style="list-style-type: none"> ● Regulation of power generation and using by fossil fuels ● Reduced appetite for investing in coal mines ● Massive reductions in coal production volumes ● Reduced Komatsu sales to coal-related customers ● Reduced appetite for investing in coal mines 	<ul style="list-style-type: none"> ● Rapid transition from fossil fuel-powered equipment to electric equipment ● Higher demand for copper and other resources necessary for electric equipment (motors, batteries, fuel cells, etc.) ● Increased Komatsu sales to copper and other relevant mining-related customers in conjunction with the trend toward electric equipment ● Increased investments for improving the efficiency of mining operations

Strategies

The initiatives based on the three pillars of growth strategies of the mid-term management plan are to accelerate growth by means of innovation, maximize earnings power, and enhance corporate resilience. Under these initiatives, Komatsu will capitalize on opportunities created by changes in resource demand to achieve sustainable growth.

<Priority initiatives>

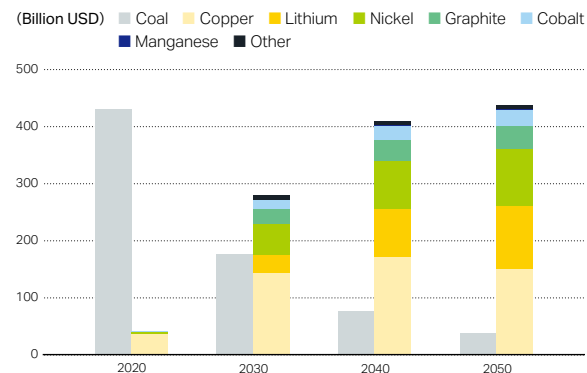
- Expand underground hard rock mining business
- Develop automated and remotely controllable mining equipment to respond quickly to shifts in demand
- Improve productivity through open technology platforms

a) Revision of mining equipment business portfolio in response to shifts in resource demand

Under the IEA's Net Zero by 2050 scenario (1.5°C scenario), demand for coal, a soft rock mineral, is expected to decline to an even greater degree than projected by 2°C scenarios as a result of the decarbonization trend. Conversely, demand is expected to grow for the critical minerals that are imperative to clean energy technologies. Accordingly, the global transition to electrified equipment is anticipated to drive a strong shift in demand toward hard rock minerals like iron, copper, and gold.

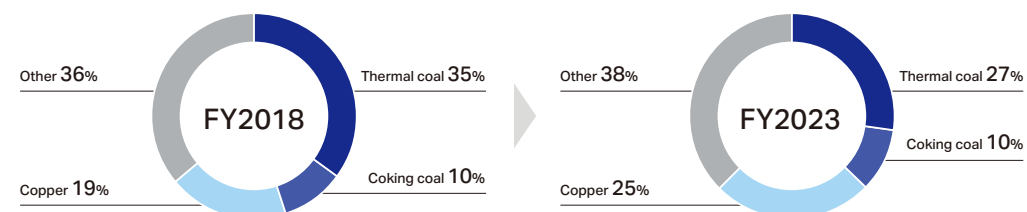
It is possible that changes in global trends could result in temporary shifts in demand. However, the overall trends in demand are expected to advance in this direction. In response to this shift in demand, the Komatsu Group is revising our mining equipment business portfolio by reorganizing underground soft rock mining equipment production and support systems, while expanding the lineup of underground hard rock mining equipment through M&A activities. As a result of these activities, the portion of net sales associated with thermal coal has gradually decreased and the portion related to copper has increased over the last few years.

Figure: Resource demand projections of IEA's 1.5°C scenario (Monetary value basis)*



* Source: Based on IEA data from the IEA (2021) Net 'Zero by 2050 A Roadmap for the Global Energy Sector', <https://www.iea.org/data-and-statistics>. All rights reserved.

Figure: Ratio of sales of Komatsu mining equipment business by target mineral



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3)-2. Transition to low-carbon products

Risks	Opportunities
<ul style="list-style-type: none"> ● Higher development and capital investment costs due to emissions restrictions ● Reduced sales due to inability to cater to customer electrification demands ● Substantial changes in technology development and competitive climate including market entry by new competitors ● Long-term diminishment of technological edge as customers begin leading the drive in component development and manufacturing projects 	<ul style="list-style-type: none"> ● Rising demand for electrified equipment, fuel-efficient equipment, and biomass fuel-powered equipment; ability to respond swiftly to impending changes in strategic markets fostered through adaptation in traditional markets ● Growth of equipment restoration (Reman) operations driven by transition to circular economy ● Increased demand for solutions businesses offering emissions-reducing benefits ● Increased product reliability due to securing stable supply sources for high-quality components for storage batteries and others

Strategies

Komatsu is advancing initiatives aimed at achieving carbon neutrality while facilitating the transition to the low-carbon products that the world demands.

<Priority initiatives>

- Develop electrified equipment using batteries, hydrogen fuel cells, and other power sources
- Develop power sources compatible with carbon-neutral fuels and hydrogen
- Deploy Smart Construction and other solutions on a global scale
- Contribute to cyclical businesses through our forestry machinery and Reman businesses

a) Development of electrified machinery equipped with batteries and hydrogen fuel cells

In FY2023, Komatsu introduced four models of electrified construction equipment to the market, including the PC200LCE/210LCE-11, an electric hydraulic excavator with a machine mass in the 20-ton class. Komatsu also developed our first concept machine for an electric forklift powered by a sodium-ion batteries. General Motors and Komatsu are co-developing a hydrogen fuel cell power module for Komatsu's 930E electric drive mining truck, the world's best-selling ultra-class haul truck. We continue to develop low-carbon products for the market toward carbon neutrality.

In December 2023, Komatsu acquired American Battery Solutions (ABS, USA), a battery manufacturer. This acquisition will accelerate the development and production of batteries optimized for Komatsu's construction and mining equipment.



Concept machine for an electric forklift with sodium-ion batteries

b) Development of power sources compatible with carbon-neutral fuels and hydrogen

Komatsu introduced a total of seven models of electrified construction equipment to the market, including tethered electric models, providing customers with a full range of options to help them achieve carbon neutrality. On the other hand, some of the sites where Komatsu's electrified construction equipment is used are located in areas where power distribution networks are not in place, making the development of power supply infrastructure a challenge.

In April 2024, with the cooperation of Denyo Co., Ltd., we developed a concept machine for a generator using a hydrogen-mixed combustion engine (hydrogen-mixed combustion generator) as a power feeder for electric mini excavators. This machine is capable of generating electricity by mixing up to 40% hydrogen with fuel (diesel fuel), reducing carbon dioxide (CO₂) emissions during power generation by up to 40% compared to the use of diesel fuel only. In addition, hydrogenated vegetable oil (HVO fuel)* refined from renewable raw materials can be used as an alternative to diesel fuel, further reducing CO₂ emissions during power generation.

The use of this generator at sites where power distribution networks are not yet in place will help reduce CO₂ emissions while creating a power supply environment. We intend to resolve needs and provide know-how of power supply equipment and issues related to the use of hydrogen through proof-of-concept experiments at the actual sites of our customers.

* Paraffinic fuel refined from renewable raw materials such as waste cooking oil



Portable hydrogen co-firing generator (Concept machine)

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c) Develop Smart Construction and other solutions businesses

Working with EARTHRAIN Ltd., a Komatsu Group company, we jointly developed the Smart Construction Teleoperation system for construction equipment, marketing the system in Japan through Komatsu Customer Support Japan Ltd.

This system allows the remote operation of hydraulic excavators from the safety and comfort of an office or other environment. When linked with various Smart Construction solutions, users may operate hydraulic excavators remotely while monitoring the operation of dump trucks and switching between multiple construction machines from a single cockpit. By providing this system to customers, we contribute to improving safety and productivity at construction sites, solving issues such as labor shortages, and reducing CO₂ by optimizing on-site construction.



Space-ship type cockpit for remote control

d) Contribute to cyclical businesses through forestry machinery and Reman businesses

To contribute to the reduction of environmental impact, Komatsu is developing the forestry equipment business, which aims for recycling-oriented forestry, and the component remanufacturing business, which is a component of our remanufacturing business.

P.23 Komatsu strengths: Reman business

P.41 Special feature 2 Contributing to a sustainable and circulating forestry industry

3)-3. Manufacturing costs

Risks	Opportunities
<ul style="list-style-type: none"> Taxation of fossil fuels and CO₂ emissions Higher product purchase prices Rising costs following investment in power generation facilities with low CO₂ emissions 	<ul style="list-style-type: none"> Increased competitiveness through production technologies that reduce CO₂ emissions

Strategies

Komatsu mitigates cost increases by achieving CO₂ reduction and renewable energy targets, while developing production bases with low environmental impact.

<Priority initiatives>

- Create plants with zero environmental impacts
- Encourage environmental investments through internal carbon pricing (ICP)*.

* Framework for increasing the priority of environmental investments through assessments of capital investment returns that treat CO₂ reduction benefits as a value similar to cost reduction benefits

a) Scenario analysis: Impact of carbon taxes under 1.5°C scenario

The 1.5°C scenario projects carbon tax rates that are higher than those predicted by the 2°C scenarios, reflecting high tax rates in both developed and emerging countries in 2030 and ongoing increases thereafter. Higher carbon prices as a result of carbon taxes and other government policies present the risk of future increases to manufacturing costs. Conversely, if Komatsu takes action to achieve CO₂ emissions reduction targets, these efforts will help lower the costs associated with carbon taxes.

Moreover, carbon taxes also influence the prices of fuel used by equipment. Accordingly, Komatsu's initiatives for developing low-carbon products and otherwise reducing CO₂ emissions from product use will contribute to a lower cost burden for customers.

Figure: Projected carbon taxes (\$/ton- CO₂)

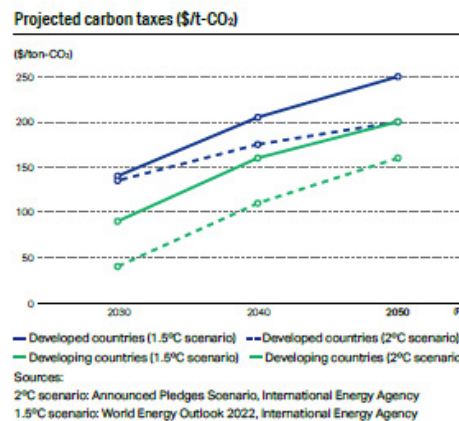
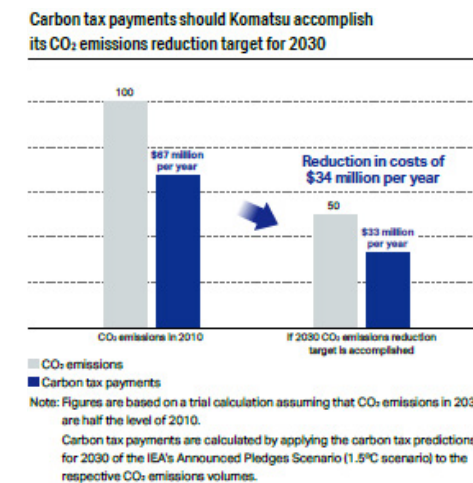


Figure: Carbon tax payments if Komatsu accomplishes CO₂ emissions reduction targets for 2030



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3)-4. Natural disasters

Risks	Opportunities
<ul style="list-style-type: none"> Increased frequency and intensity of heavy rain and floods due to abnormal weather Risks of disaster damages to Komatsu plants at high risk of flooding Component supply delays following damages to suppliers from disasters 	<ul style="list-style-type: none"> Increased demand for flood-control works towards national resilience

Strategies

Komatsu will implement countermeasures against heavy rains and flooding across the value chain (response to physical risks).

<Priority initiatives>

- Build production and procurement systems that are resilient to changes in the operating environment (expand multi-sourcing ratio)

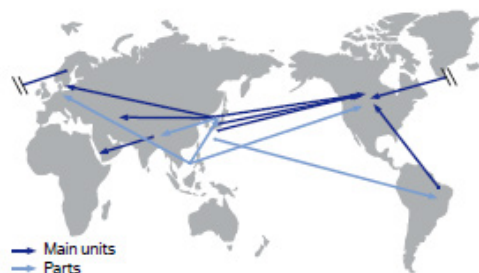
a) Global cross-sourcing and multi-sourcing

To hedge against risks of damage to the factories of Komatsu and suppliers due to heavy rains, floods, and other natural disasters, the Komatsu Group is developing a production and procurement system to maintain business continuity even under extreme circumstances. Specifically, we practice cross-sourcing, which allows us to change manufacturing plants and product destinations flexibly based on changes in the operating environment, and multi-sourcing, through which we purchase the same parts from multiple suppliers.

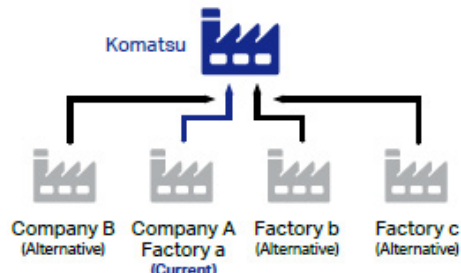
In addition, we established Asia procurement centers at overseas subsidiaries in India, Indonesia, and Thailand in May 2023 to increase the multi-sourcing ratio to further strengthen our supply chain.

Figure: Global cross-sourcing structure and multi-company procurement structure

Global cross-sourcing operation for production



Multi-company procurement system



Special Feature

Predicted increase in frequency and intensity of heavy rainfall

The Komatsu Group has experienced frequent flood damage in Japan and Indonesia in the past. Therefore, we conduct regular flood risk surveys to identify high-risk bases and take necessary measures. The IPCC's Sixth Assessment Report predicts that the frequency and intensity of heavy rainfall will increase dramatically in the future as a result of global warming. In response, Komatsu conducted a flood risk study in 2023 to identify high-risk sites and evaluate the financial impact.

1. Scenario analysis: frequency and intensity of 1-in-10-year heavy rainfall events¹

	[Past] 1850-1900	[Present] 1°C	[Future] Level of global warming		
			1.5°C	2°C	4°C
Frequency of occurrence per decade (Median)	1 time	1.3 times	1.5 times	1.7 times	2.7 times
Strength (Wetted ²)		+6.7%	+10.5%	+14.0%	+30.2%

Global warming 1.5°C projection

- With a global warming of -1.5°C, heavy rains and associated flooding are expected to increase in intensity and become more frequent in most parts of Africa and Asia, North America, and Europe.

Global warming 4°C projection

- The magnitude of drought and heavy rainfall and changes in mean precipitation will increase compared to the case of -1.5°C.
- Heavy rains and associated flooding are expected to intensify and become more frequent in the Pacific Islands and in many parts of North America and Europe.

¹ Based on the IPCC Sixth Assessment Report, Working Group I Summary for Policymakers, Tentative Translation SPM.6 (MEXT and JMA)

² Wetting: An increase in the percentage of water vapor in the atmosphere.

2. Risks

We used hazard maps and other information to estimate the financial impact of shutdowns at domestic and overseas sites.

Assumed Damage and Impact	Financial Impact (single year) Current damage estimates	Initiatives
Decrease in sales due to shutdown of production facilities caused by the flooding	20.4 billion yen - 55.3 billion yen ³	<ul style="list-style-type: none"> To date, we have implemented heavy rainfall countermeasures at domestic and overseas plants at high risk of flooding (e.g., measures for 100 mm/h rainfall in Japan). Assuming a 4°C scenario, the damage from flooding could be severe, so we will evaluate current measures periodically and implement new measures as necessary.

³ Estimates for overseas bases: We assume inundation depths based on hazard maps for domestic bases. We also incorporated damage coefficients for inundation zones in Japan into the calculations.

3. Opportunities

If global warming progresses and flood damage becomes more severe in the future, responses to national land resilience and other measures may become more active, leading to an increase in demand for construction equipment.

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Column

Underwater construction of the future

In recent years, there has been a growing need for construction work at the dangerous water's edge and shallow water areas to prevent damage from natural disasters and provide recovery post-disaster. These disasters are becoming more severe and frequent due to climate change, as is the risk of impending massive earthquakes. In addition, the construction industry is experiencing a serious shortage of skilled workers due to declining birthrates and aging populations, especially in Japan.

Komatsu developed a radio-controlled amphibious bulldozer in 1971, selling 36 units globally. Asunaro Aoki Construction owns all five of the units still in operation today, and has accumulated knowledge and construction technologies through more than 1,200 underwater construction projects, including post-disaster reconstruction after the Great East Japan Earthquake.

We are working with Asunaro Aoki to demonstrate underwater electric construction robots that can be operated at depths of up to 50 meters without the aid of skilled technicians using automatic control and ICT functions. In cooperation, we are also striving for the underwater construction of the future, a solution for ultra-remote operation of underwater construction robots from a safe and comfortable office, based on a construction plan optimized by AI analysis that combines 3D survey, design, and construction data and big data, such as weather data and construction history.

We plan to introduce this system at the Future Life Expo: Future City exhibit of the Future Society Showcase Project for Expo 2025 Osaka, Kansai, Japan. We will continue to develop this underwater construction of the future for labor savings, increased efficiency, and improved safety, ensuring everyone can play an active role and perform faster construction work.



Key visual for "Future Life Expo: Future City," of the Future Society Showcase Project. Expo 2025 Osaka, Kansai, Japan

(3) Risk management

The main risks and opportunities related to climate change are described under the individual strategies. Major climate change-related risks are incorporated into the Risk Management Rules and other aspects of the Group-wide risk management process and managed as an element of corporate risks.

P.77 Risk management

Web Major risks and assessment (ESG Databook)

(4) Indicators and targets

Medium- to long-term targets

Index	Target
Reduction of environmental impact	• CO ₂ emissions Decrease by 50% by 2030 from 2010 <i>Carbon neutrality by 2050 (challenging goal)</i>
	• Renewable energy use Increase to 50% of total energy use by 2030

We are accelerating our efforts to become carbon neutral. For our product development roadmap, please refer to Special Feature 1: Medium- to Long-term R&D Strategy.

P.37 Special feature 1 Medium- to long-term R&D strategies

Please click here to see the results of our activities in FY2023, including the status of our environmental investments.

Web Environmental data (ESG Databook)

Nature conservation efforts - Transplanting trees from the head office rooftop garden

Komatsu's head office building is under reconstruction (completion of the new building scheduled for September, 2026). We undertook a project to transplant many of the trees and plants that have grown together with the building and employees since completion in 1966. In November 2023, we held a rescue event to save many plants in the rooftop garden, with the participation of the president and many other employees. The destinations of the rescued plants varied, with some taken home by employees and others transplanted to Yuki Farm in Ibaraki Prefecture. All 250 pots prepared by the secretariat for the event were used to transplant the plants.

Since large, well-grown trees such as cherry, birch, and goby could not be loaded onto elevators, we made arrangements to close the road in front of the Komatsu to traffic late at night in January 2024. We used a large crane to unload the trees and transport them to the farm. As of the end of this 10-month project, approximately 120 trees and more than 300 plants and trees from the rooftop garden were moved to the Yuki Farm.



Plant rescue event in which the president also participated



Trees being removed by crane