

Initiatives for Building a Decarbonized Society

Climate Change Strategy

Basic Approach

On the issue of climate change, the IPCC 6th Assessment Report in 2023 noted that there is “no room for doubt” that human activities have caused global warming, emphasizing the urgent need to reduce GHG^{*1}. The world has been pursuing initiatives since 2020 under the Paris Agreement, and in response to the Glasgow Climate Pact established at the 2021 United Nations Climate Change Conference (COP26), the international community has made a significant change in direction toward the 1.5°C goal – namely to achieve carbon neutrality by 2050.

At the Mitsubishi Materials Group, we also take the issue of climate change seriously, in keeping with our corporate philosophy of “For People, Society and the Earth.” We have set our target year for achieving carbon neutrality to fiscal 2046, five years ahead of Japan’s national target year of fiscal 2051. Additionally, by fiscal 2051 we aim to achieve renewable energy generation comparable to the power we consume internally, resulting in an effective 100% self-sufficiency rate for renewable energy. In these ways, we will continue to pursue business activities aimed at realizing a decarbonized society.

*1 GHG: Greenhouse gas

Information Disclosure

In March 2020, the Group decided to endorse the recommendations of the TCFD^{*2} and participate in the TCFD Consortium, which consists of companies, financial institutions and other organizations which support those recommendations. We will appropriately disclose the impact (risks and opportunities) of climate change on the Group’s business operations and the results of analyzing that impact in line with the TCFD recommendations.

The Group answers questionnaires for the CDP (a non-profit organization) on a yearly basis. On an 8-step scoring from A to D-, in fiscal 2023, we have achieved an “A-” in the CDP Climate Change assessment. Also, in CDP water security assessment, we have successfully achieved the highest rank “A” for the first time, and selected as an A List company. For details, please see the following link.

*2 TCFD: Task Force on Climate-related Financial Disclosures. The TCFD was established in 2016 by the Financial Stability Board, an international organization that seeks to stabilize financial systems.

[PDF CDP Score Report Climate Change 2022](#)

[PDF CDP Score Report Water Security 2022](#)

▶ [Selected for CDP’s 2022 “A List,” the Highest Rank, for the First Time in the Water Security Category](#)

Governance

We have appointed Executive Officers to segregate our management strategies, including responding to the issue of climate change. We have also established a Sustainable Development Department as a dedicated department in the Strategic Headquarters to plan and promote the Group’s strategic initiatives for risks and opportunities related to climate change. The Sustainable Development Department conducts scenario analyses based on the TCFD recommendations, evaluates and manages risks and opportunities related to climate change, formulates and manages action plans to reduce GHGs, and engages in other discussion and information sharing concerning climate change. In addition, activities are reported to the Strategic Management Committee and the Board of Directors for appropriate monitoring. (Matters for deliberation by and reporting to the Strategic Management Committee and Board of Directors)

- Greenhouse gas emission reduction target setting and reduction plans
- Climate change-related information for disclosure
- Assessment of climate change-related risks and opportunities for each business

The Board of Directors goes beyond the monitoring of sustainability initiatives. The Sustainability Committee, an advisory body to the Board of Directors, was established to actively consider the direction of sustainability efforts from different perspectives and present its findings internally. The committee monitors the Company's action related to climate change, considers the methods and issues involved, and reports its findings to the Board of Directors.

Strategy

In March 2021, based on the recommendations of the TCFD, we conducted scenario analyses to ascertain the impact (risks and opportunities) that climate change has on the Group's business operations and consider measures aimed at mitigating the risks and capitalizing on the opportunities.

With regard to transition risks and opportunities, in February 2023 we updated our scenario analyses while maintaining consistency with the Medium-term Management Strategy FY2031, and set business indicators and targets. Setting 1.5°C and 4°C scenarios, we estimated the financial impact on the Group in the event that policies and legislation on climate change were stepped up, and carbon pricing was introduced and strengthened. We also analyzed the impact on our business operations in terms of risks and opportunities with regard to the shift in EV demand, changing forms of energy use, and changing demand for the recycling business due to the shift to a recycling-oriented society. Further, in terms of physical risks, in our Group-wide risk management activities we also manage water risks including damage from acute and chronic risks including torrential rain, flooding, storm surges and droughts thought to have materialized in relation to climate change.

For details about our scenario analysis results, please refer to the section on [Climate Change-related Risks and Opportunities](#)

Risk Management

The Mitsubishi Materials Group recognizes that climate change risks are one of the key risks that could have a significant impact on the Group's business performance and financial condition, and drives initiatives to address these risks within its risk management activities.

For more details about the Group's risk management system, operating status and the selection process for major risks, please refer to the section on [Risk Management](#)

Indicators and Targets

We set the Mitsubishi Materials Group's GHG emissions reduction targets (Scope 1 and Scope 2) to a reduction of 45% in GHG emissions by fiscal 2031 compared to the fiscal 2021 level, with the medium- to long-term target of achieving net zero GHG emissions, or carbon neutrality, by fiscal 2046.

To achieve the target, we will invest 10.5 billion yen chiefly in energy saving and an improvement of facilities at production bases by fiscal 2031 and reduce GHG emissions. To achieve carbon neutrality by fiscal 2046, we will strive to develop renewable energy, primarily geothermal power generation in which we excel, and expand the use of renewable energy. We will set a target of renewable energy power accounting for 100% of power used internally and renewable energy power generated in-house accounting for 66% by fiscal 2036. To this end, we will invest 30.0 billion yen in the renewable energy business by fiscal 2031. Specifically for Metalworking Solutions business, ahead of other businesses, we set a target to switch all power used in manufacturing to practically CO₂ emission-free electricity by fiscal 2031, and to promote manufacturing activities to contribute to our customers as their "Global Craftsman Studio." As for Scope 3 that includes business partners' GHG emissions, which is the emissions of the entire supply chain excluding Scopes 1 and 2, we started to collect and disclose actual data from emissions in fiscal 2021. Moving forward, we will improve the accuracy of the calculation by sharing information with suppliers. At the same time, we will reduce the emissions over the long term based on suppliers' GHG reduction plans and others. To achieve this, we will aim to decarbonize the supply chain related to our products, and have set the target of reducing Category 1, 3 and 15 emissions, which together account for roughly 88% of all Scope 3 emissions, by at least 22% compared with fiscal 2021 levels by fiscal 2030.

In March 2023, Mitsubishi Materials Corporation obtained SBT*³ certification, indicating that it has established greenhouse gas emissions reduction targets that are scientifically consistent with the targets established by the Paris Agreement. For the numerical results for fiscal 2023 in relation to these targets, please refer to the section on [Climate Change-related Risks and Opportunities](#).

In addition, we have initiated efforts towards the assessment and utilization of Carbon Footprint (CFP)*⁴, and are progressing in tracking the GHG emissions of products using recycled materials such as tungsten and copper scrap.

In terms of plans for executing initiatives aimed at achieving our targets for the reduction of greenhouse gas emissions, in addition to energy-saving and utilization of existing technologies, we are also advancing considerations and discussions - primarily through our Climate Change and Energy Panel - including those regarding R&D and capital expenditure for driving new innovation.

*4 Calculation and disclosure of greenhouse gas emissions throughout the product and service lifecycle

GHG reduction target

Renewable energy utilization rate

Scope 1 and 2 reduction Plan

Scope 3 reduction Plan

GHG emissions (kt-CO₂e)

GHG reduction investment in facilities and processes of 10.5 billion yen by FY2031

Reduction through technological development and utilization of external technologies

Target of carbon neutrality by FY2046 and 100% self-sufficiency in renewable energy power by FY2051

Reduction focused on Scope 2 for FY2031

Risks and Opportunities Related to Climate Change

The financial impact on the Group will be in the form of additional costs incurred in depending on the amount of greenhouse gas emissions, such as when policies and legal regulations on climate change are toughened, and carbon pricing systems (the emissions trading system and carbon tax) are introduced and strengthened. With the global shift to decarbonized societies, certain product markets in which the Group has traditionally been participating are expected to shrink. Any delay in taking action in new expanding markets could adversely affect the Group's results and financial position. The world is currently transitioning rapidly toward a carbon-neutral society based on the Paris Agreement. We believe we need to provide new value by responding quickly to these changes in the social environment.

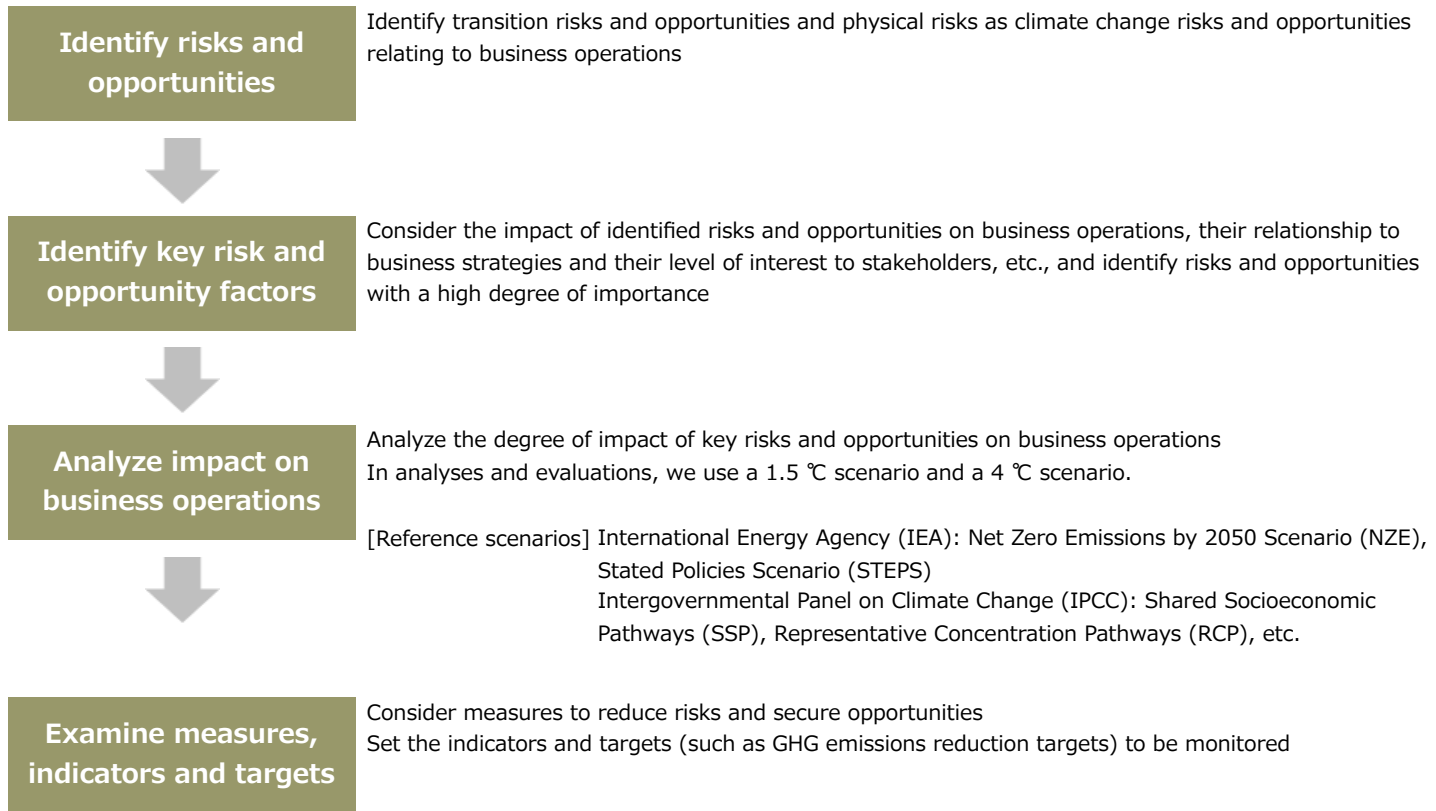
Specifically, we will continue to steadily reduce greenhouse gas emissions from Group business activities by setting greenhouse gas reduction targets, introducing energy-saving equipment, and expanding the use of renewable energy. Furthermore, in order to improve the market competitiveness of Group products, we are enhancing our production processes and developing environmentally friendly products.

Physical risks - including damage from intensified acute water risks thought to be related to climate change such as superstorms, floods, storm surges, or drought, as well as chronic risks - are covered by Group-wide risk management activities. Meanwhile, opportunities arising due to climate change include an expected increase in demand for technologies, products and services that contribute to energy saving and the reduction of greenhouse gas emissions due to the toughening of climate change policies and other measures. The Group takes initiatives such as the manufacturing of materials and products that contribute to decarbonization, the recycling of nonferrous metal resources, the development and promotion of the use of renewable energy such as geothermal power, the development of technologies related to CO₂ capture and effective utilization, and conservation activities for the forest land we own. Through these initiatives, we aim to create both economic and social value.

■ **Scenario Analysis**

In March 2021, the Group established and analyzed scenarios to ascertain the impact of climate change on the Group's business operations (risks and opportunities) and consider measures for reducing risks and securing opportunities. In February 2023, we updated the scenario analysis and set indicators and targets, while ensuring consistency between transition risks and opportunities and the Medium-term Management Strategy FY2031. We will monitor the situation based on the indicators and targets. We are updating the analysis of physical risks and examining indicators and targets.

Process for identifying risks, opportunities and response measures



Scenario Analysis – World as Envisaged in 2030–2050

■ World as envisioned in analysis

1.5 °C Scenario (the world moving toward carbon neutrality in 2050)	4 °C Scenario (the world as it is and the world in which things are allowed to take their course)
<p>A scenario that charts out a path for the world's energy sector to follow to achieve net zero CO₂ emissions by 2050. The scenario envisages the world where the social changes necessary for the establishment of a carbon free society and holding the rise in the global average temperature to 1.5 °C or less until the end of this century will impact business operations.</p> <p>[World as envisaged]</p> <ul style="list-style-type: none"> • The setting of a carbon price and the rise of prices globally • Progress in the transition from fossil fuels to renewable energy • Progress in the modal shift and the shift to EVs • Increase in demand for the use of public transportation and vehicle sharing • Preferential selection of decarbonized products by users • Transition to a recycling-oriented society and an increase in waste recycling rates 	<p>A scenario reflecting present the policies formulated based on an evaluating specific policies being implemented and policies announced by governments around the world by country or by sector. The scenario envisages the world as described below where the achievement of targets is not required and the global average temperature will rise about 4 °C by the end of the this century.</p> <p>[World as envisaged]</p> <ul style="list-style-type: none"> • Dependency on fossil fuels, increased energy costs • Remarkable economic growth of emerging and developing countries • Slowdown of the shift to modes of mobility with low CO₂ emissions • Limited demand for renewable energy • Intensification of wind and water-related disasters and increase in disaster-related waste • Increased severity of water stress and heat stress

Overview of MMC's Scenario Analysis Based on TCFD Recommendations

With regard to transition risks and opportunities related to climate change, we conducted scenario analysis for one theme across the Company and for three major themes for each business (total of nine minor themes). The external and internal data used in the analysis were updated.

Scenario	Theme		Risk/Opportunity Elements	Impact on Business	Business
1.5°C Scenario / 4°C Scenario	Changes in Carbon Tax, Energy Costs, etc.		Introduction/strengthening of carbon price tax system (increase in operation costs)	Risk: Large	Common to all businesses
1.5°C Scenario	Changes in EV Demand	Changes in Product Demand Due to EV Shift	Increase in xEV sales volume	Opportunity: Large	Copper & copper alloy business
		Changes in Demand Related to Modal Shift and EV Shift	Rapid change in market for processed products due to modal shift, etc.	Risk: Medium	Metalworking Solutions business
		Changes in Demand for Copper Due to Progress in Responding to Climate Change	Increase in xEV sales volume	Opportunity: Large	Smelting and resource recycling business
		Changes in Demand Related to Automobile Recycling	Decrease in the number of scrapped vehicles	Risk: Small	Smelting and resource recycling business
	Changes in Forms of Energy Use	Changes in Demand Related to Batteries	Increase in demand for EV batteries and storage batteries	Opportunity: Large	Metalworking Solutions business
		Changes in Demand Related to LIB-R and PV-R	Increase in demand for automotive LIB and solar panel recycling	Opportunity: Large	Smelting and resource recycling business
		Changes in Demand for Renewable Energy	Increase in spread and demand for renewable energy	Opportunity: Large	Renewable energy business
	Changes in Demand for Recycling Business Due to Shift to Recycling-Oriented Society	Changes in Demand for E-scrap Recycling Business Due to Shift to Recycling-Oriented Society	Increase in demand for E-scrap recycling	Opportunity: Medium	Smelting and resource recycling business
		Changes in Demand Related to Home Appliance Recycling	Increase in demand for home appliance recycling	Opportunity: Medium	Smelting and resource recycling business

※ New themes written in red

Changes in Carbon Tax, Energy Costs, etc. (Common to all Businesses)

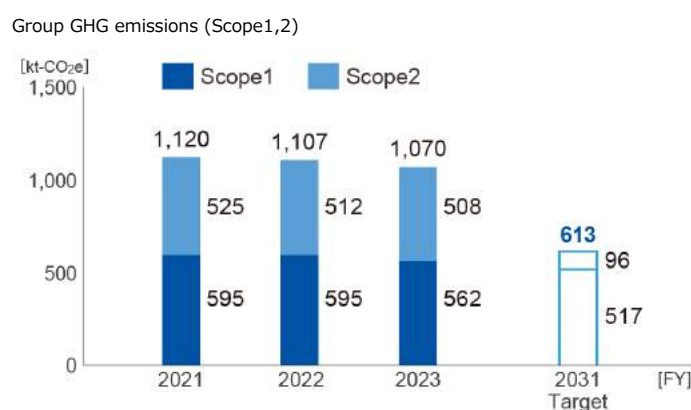
● Risk factor: Introduction/strengthening of carbon price tax system (increase in operation costs)

Anticipated world and business impact	Increase in production costs due to introduction/strengthening of carbon price system <ul style="list-style-type: none"> Higher taxation on GHG emissions and increased energy costs due to higher electricity prices Increased green power certificate procurement amounts and emissions trading costs fiscal 2031 CP estimated to be approximately 5.3-10.5 billion yen, and energy cost increase from fiscal 2021 estimated to be 7.1-7.5 billion yen
Impact analysis	<p>Carbon prices will be a factor in increasing our costs. The impact of carbon prices on society as a whole is a risk that will result in lower revenue if GHG emissions reductions are delayed or not passed on to our product prices.</p> <div data-bbox="1299 510 1517 763"> <p>Business impact assessment</p> <p>↓</p> <p>Risk: Large</p> </div>
Indicator	<div> <div>Group GHG emissions (Scope1,2)</div> <div> Target <ul style="list-style-type: none"> 45% reduction in emissions by fiscal 2031 (compared to fiscal 2021) Achieve carbon neutrality by fiscal 2046 </div> </div>
Future strategies and responses	<ul style="list-style-type: none"> Formulate a plan to reduce GHG emissions by fiscal 2031, reduce energy consumption by improving the efficiency of facilities and processes, electrify processes and switch fuels, and switch to electricity derived from renewable energy sources (renewable energies). Switch 100% of our Group's electricity use to renewable energy-derived electricity by fiscal 2036 Accelerate the long-term use of CN fuels and the development of innovative technologies such as the capture and utilization of CO₂

Fiscal 2023 performance against target

■ Group GHG emissions (Scope1,2)

As the cement business became an equity method affiliate as Mitsubishi UBE Cement Corporation, and since PT Smelting plans to transition to an equity method affiliate, each of their Scope 1 and Scope 2 emissions results and targets have been re-categorized under Scope 3 Category 15. Figures related to the aluminum business, in addition, other businesses and subsidiaries that will be removed from the scope of consolidation due to business transfers by fiscal 2023 have been excluded from the results and targets. The greenhouse gas emissions for the fiscal year 2023 were reduced by 4.5% compared to the fiscal year 2021.



Changes in Product Demand Due to EV Shift (Copper & Copper Alloy Business)

● Opportunity factor: Increase in xEV sales volume

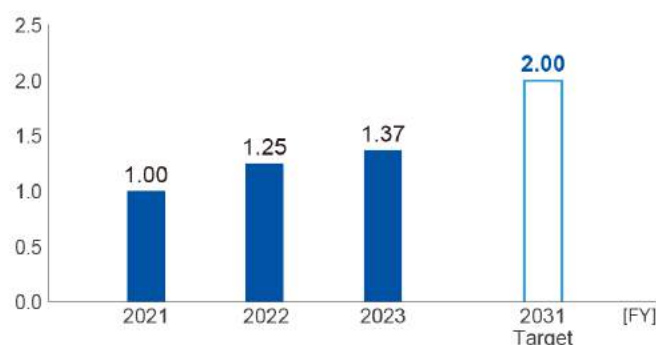
Anticipated world and business impact	Rapid growth in demand for EV-related products for decarbonization <ul style="list-style-type: none"> Overall automobile sales will increase toward fiscal 2031, and demand for connectors and bus bars for automobiles will increase 2.6 times by fiscal 2031 and 3.1 times by fiscal 2051 compared to fiscal 2021. Sales volume of xEVs is expected to increase approximately 24-fold by fiscal 2031 compared to fiscal 2021.
Impact analysis	<p>A significant increase in sales of xEVs, which use more copper products, is expected to significantly lift demand for our rolled copper products. This will be an opportunity to expand sales by strengthening production of related products and capturing demand.</p> <div> Business impact assessment  Opportunity: Large </div>
Indicator Target	<p>Sales volume of pure copper strips for vehicles (Compared to Fiscal Year 2021)</p> <p>End of fiscal 2031</p> <p>Double (compared to fiscal 2021)</p>
Future strategies and responses	<ul style="list-style-type: none"> In order to build a supply system that can meet the rapidly growing demand for products for EVs, increase our production capacity of copper components by at least 1.3 times by fiscal 2031 compared to fiscal 2021 (Production capacity is being increased at Japanese production sites) Contribute to the transition to a decarbonized society by developing products with higher performance and lower environmental impact

Fiscal 2023 performance against target

■ Sales volume of pure copper strips for vehicles

Sales volume of pure copper strips for vehicles in fiscal 2023 increased by 9.5% compared with fiscal 2022, reflecting an increase in bus bars for batteries and electronic equipment aimed at automotive component manufacturers and larger sizes driven by increased production of electric vehicles by auto manufacturers.

Sales of pure copper strips for vehicles



Changes in Demand Related to Modal Shift and EV Shift (Metalworking Solutions Business)

● Risk factors: Rapid change in market for processed products due to modal shift, etc.

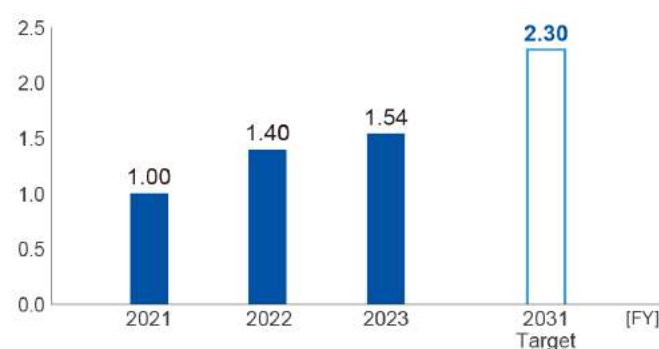
Anticipated world and business impact	<p>Decrease in demand for cutting tools for engines due to increase in EV ratio</p> <ul style="list-style-type: none"> Significant increase in xEV sales and increased use of lightweight materials Production of engine-powered vehicles is projected to decline (fiscal 2031 level estimated at 0.59 times the fiscal 2021 level), resulting in lower sales of cutting tools for engines and transmissions
Impact analysis	<p>The projected increase in demand for tools for difficult-to-machine materials due to the growth of markets related to electrification and weight reduction may provide opportunities to expand sales by reviewing the product mix and tapping into demand. On the other hand, there is a risk that sales of cutting tools for engine-powered vehicles, a current mainstay product, will decline.</p> <div> <p>Business impact assessment</p> <p>↓</p> <p>Risk: Medium</p> </div>
Indicator	Sales of cutting tools (Compared to Fiscal Year 2021)
Target	End of fiscal 2031 2.3 times (compared to fiscal 2021)
Future strategies and responses	<ul style="list-style-type: none"> Contribute to the transition to a decarbonized society by developing and supplying products such as tools for machining difficult-to-machine materials to meet growing demand in the 1.5°C scenario, and expanding our global market share. In the automotive product market, we will closely monitor the trend toward EVs and develop tools for processing EV parts as necessary. In the new markets that will replace the automotive industry, we also aim to increase sales of cutting tools by targeting the small precision machining field (robots, semiconductor manufacturing equipment, telecommunications, etc.) as a strategic market.

Fiscal 2023 performance against target

■ Sales of cutting tools

Sales of cutting tools in fiscal 2023 increased 10.0% from fiscal 2022, reflecting higher demand from aircraft and medical device manufacturers, primarily in Europe and the United States.

Sales of cutting tools



Changes in Demand for Copper Due to Progress in Responding to Climate Change (Smelting and Resource Recycling Business)

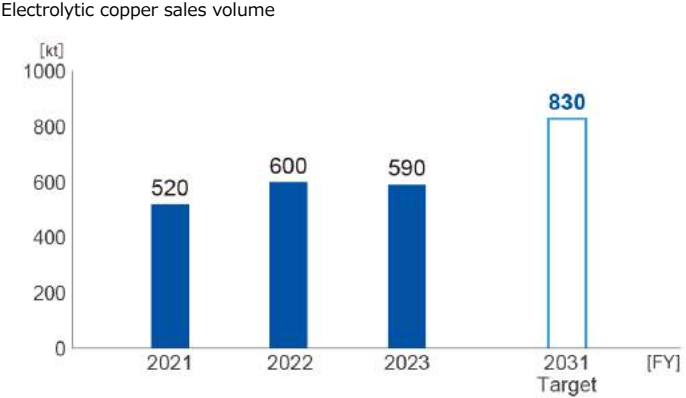
● Opportunity factor: Increase in xEV sales volume

Anticipated world and business impact	Rapid growth in copper demand due to increased EV sales aimed at decarbonization <ul style="list-style-type: none"> Overall automobile sales will increase toward fiscal 2031, and copper requirements will increase 3.3 times by fiscal 2031 and 4.6 times by fiscal 2051 compared to fiscal 2021. Sales volume of xEVs is expected to increase approximately 24-fold by fiscal 2031 compared to fiscal 2021. 		
Impact analysis	<p>A significant increase in sales of xEVs, which use more copper, is expected to significantly lift global copper demand. This will be an opportunity to increase sales by capturing demand through the expansion of our electrolytic copper production capacity.</p> <div> <div>Business impact assessment</div> <div>↑</div> <div>Opportunity: Large</div> </div>		
Indicator	Electrolytic copper sales volume	Target	End of fiscal 2031 830,000t
Future strategies and responses	<ul style="list-style-type: none"> To meet growing copper demand, we will invest in facilities at our domestic bases and increase our copper ore processing volume by 1.3 times (Naoshima) and electrolytic copper sales volume by 1.4 times (overall business) from the current levels by fiscal 2031. This stable supply of electrolytic copper will contribute to the transition to a decarbonized society. 		

Fiscal 2023 performance against target

■ Electrolytic copper sales volume

Electrolytic copper sales volume in fiscal 2023 was 590,000 tons, on par with fiscal 2022.



Changes in Demand Related to Automobile Recycling (Smelting and Resource Recycling Business)

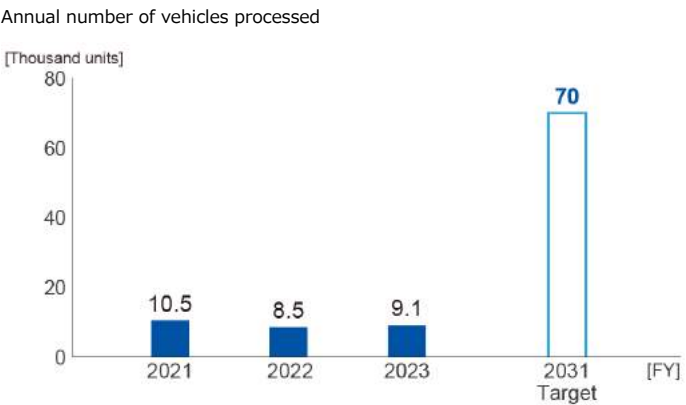
● Risk factor: Decrease in the number of scrapped vehicles

Anticipated world and business impact	<p>Decrease in the number of scrapped vehicles due to the decline in the Japanese population and the advance of car sharing in a decarbonized society</p> <ul style="list-style-type: none"> Due to the declining population in Japan and the decrease in sales volume resulting from the advance of car sharing, the number of scrapped automobiles in Japan will remain almost flat in fiscal 2031 compared to fiscal 2021, and will decrease by about 0.85 times by fiscal 2051. The overall number of vehicles processed will decrease, but the percentage of next-generation vehicles will increase (18% by fiscal 2031 and 78% by fiscal 2051).
Impact analysis	<p>The number of vehicles processed in Japan is expected to decline, and there is a risk that automobile recycling sales will decline.</p> <div> <div>Business impact assessment</div> <div>↓</div> <div>Risk: Small</div> </div>
Indicator	<div>Annual number of vehicles processed</div> <div>Target</div> <div>End of fiscal 2031 70,000 units</div>
Future strategies and responses	<ul style="list-style-type: none"> Aim to increase sales by expanding our market share, on the strength of our efficient processing technology for next-generation automobiles utilizing technology accumulated in the home appliance recycling business As a processing base for next-generation automobile recycling, we will increase our processing capacity by utilizing alliances in current technology demonstrations, etc., and expanding the number of sites to a total of three. Contribute to the realization of a recycling-oriented society by meeting resource recycling needs through automobile recycling

Fiscal 2023 performance against target

■ Annual number of vehicles processed

The annual number of vehicles processed in fiscal 2023 increased 7.0% from fiscal 2022 to 9,100, despite the sharp rise in prices of used cars and a reduction in vehicles received from dealerships.



Changes in Demand Related to Batteries (Metalworking Solutions Business)

● Opportunity factor: Increase in demand for EV batteries and storage batteries

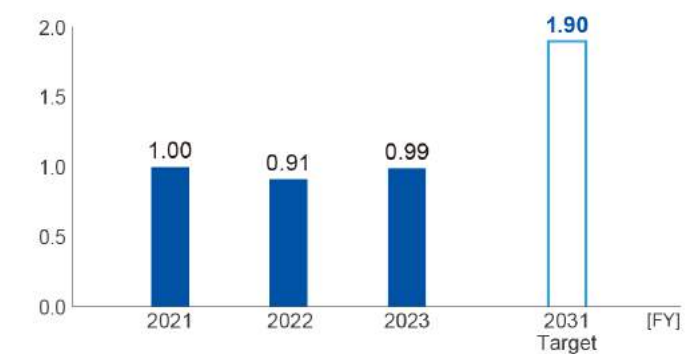
Anticipated world and business impact	Growing demand for tungsten powder due to increase in EV batteries and stationary storage batteries <ul style="list-style-type: none">Demand for EV batteries is projected to grow 21-fold by fiscal 2031 and 30-fold by fiscal 2051 compared to fiscal 2021 due to increased sales of BEVs and PHEVs.Growing demand for renewable energy is expected to lead to an approximately 20-fold increase in stationary storage battery installations by fiscal 2031 and a 22-fold increase by fiscal 2051, compared to fiscal 2021.		
Impact analysis	The growing demand for EVs and the rapid increase in demand for storage batteries are expected to significantly increase demand for high-performance powders for rechargeable batteries . This will be an opportunity to increase sales by capturing demand through the expansion of our production capacity for tungsten-based high-performance powder.		Business impact assessment ↑ Opportunity: Large
Indicator	Production of high-functional powder for rechargeable batteries	Target	End of fiscal 2031 1.9 times (compared to fiscal 2021)
Future strategies and responses	<ul style="list-style-type: none">Contribute to the transition to a decarbonized society by developing and supplying products to meet growing demand in the 1.5°C scenario, such as tungsten powder products for LIBs for EVs and LIBs for solar power generation equipment.Expand our tungsten powder product business in cooperation with Masan High-Tech Materials.Contribute to the realization of a recycling-oriented society by promoting tungsten recycling		

Fiscal 2023 performance against target

■ Production of high-functional powder for rechargeable batteries

Production volume of high-functional powder for rechargeable batteries in fiscal 2023 increased 8.4% compared with fiscal 2022, reflecting expanded demand for cathode materials due to growth in the rechargeable battery market.

Production volume of high-functional powder for rechargeable batteries (Compared to fiscal 2021)



Changes in Demand Related to LIB-R and PV-R (Smelting and Resource Recycling Business)

● Opportunity factor: Increase in demand for automotive LIB and solar panel recycling

Anticipated world and business impact	Increase in recycling demand due to emissions of automotive LIBs and PVs <ul style="list-style-type: none">Considering the reuse of LIBs generated from scrapped xEVs, the recycling volume is expected to increase approximately 50-fold by fiscal 2031 and more than 350-fold by fiscal 2051, compared to fiscal 2021.Considering the reuse of solar panels, the recycling volume is expected to increase approximately eight-fold by fiscal 2031 and more than 300-fold by fiscal 2051, compared to fiscal 2021.		
Impact analysis	Due to increased demand for EVs and solar power generation, it is anticipated that the emissions of automotive LIBs and PVs will increase in the future, and that the demand for recycling will increase accordingly . This will be an opportunity to increase sales by promoting commercialization based on demonstration tests currently underway.		<div>Business impact assessment</div> <div>↑</div> <div>Opportunity: Large</div>
Indicator	Amount of automotive LIBs recycled*	Target	End of fiscal 2031 870t-LIB
Future strategies and responses	<ul style="list-style-type: none">Commercialize PV recycling to broaden the scope of target items at home appliance recycling sitesContribute to the realization of a recycling-oriented society by developing automobile and LIB recycling sites in each region, and by working to upgrade and streamline recycling technologies		

* Up to the point of black mass production (including LIB removal, discharging, dismantling, pyrolysis, crushing, and sorting).

Fiscal 2023 performance against target

■ State of development of LIB recycling technologies

Fiscal 2023 performance against target State of development of LIB recycling technologies A demonstration test (running from 2020 to 2022) of LIB recycling at Kitakyushu Eco-Town commissioned by the Ministry of the Environment has been completed. The demonstration test involved considering a consistent LIB recycling process of removing automotive LIB units from vehicles, automating the discharge and disassembly of the removed LIB units, thermally cracking, crushing and sorting the LIB modules, and recovering Co and Ni from the active materials, identifying the current issues in each process, and conducting LCA and economic assessments of LIB recycling overall. In fiscal 2024 and beyond we will continue to pursue the development of these technologies, build the business foundations for LIB removal, disassembly processing and BM recovery , and establish the technologies for the safe, efficient and appropriate processing of automotive LIBs that will increase as waste products in the future, thereby making progress in considering ways to help build a recycling-oriented society.

Changes in Demand for Renewable Energy (Renewable Energy Business)

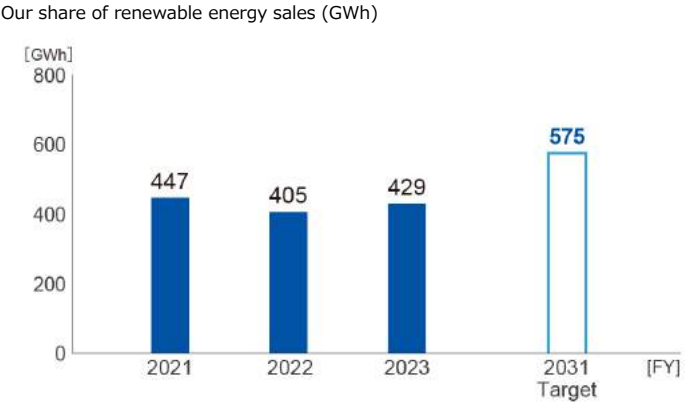
● Opportunity factor: Increase in spread and demand for renewable energy

Anticipated world and business impact	Medium- and long-term expansion of the renewable energy market toward a net-zero society <ul style="list-style-type: none">Demand for renewable energy is expected to keep growing, with Japan's geothermal and wind power generation projected to increase 4.7-fold and 9.8-fold, respectively, by fiscal 2031 and 15-fold and 48-fold, respectively, by fiscal 2051, compared to fiscal 2021.Environmental value ranges from 0.3 yen to 4 yen/kWh depending on the spread of renewable energy and supply and demand.		
Impact analysis	While the unit price of electricity sold and the price of non-fossil certificates fluctuate according to environmental policies and technological advances, the demand for renewable energy itself will grow , especially for wind and geothermal power generation . Investigating and developing new power generation sites will provide an opportunity to expand our Renewable Energy business .		<div>Business impact assessment</div> <div>↑</div> <div>Opportunity: Large</div>
Indicator	Our share of renewable energy sales volume	Target	End of fiscal 2031 575GWh
Future strategies and responses	<ul style="list-style-type: none">Work to improve profitability through stable operation of existing power plants and utilization of environmental values, etc.Focus on investigation and development of new power generation sites (development of new geothermal projects in the Hachimantai district and other regions, and entry into wind power generation)Aim to expand the scale of power generation and related businesses through collaboration with other companies		

Fiscal 2023 performance against target

■ Our share of renewable energy sales

Fiscal 2022 generating capacity was lower as the year coincided with the periodic inspection of the Sumikawa Geothermal Power Plant. As a result, our share of renewable energy sales for fiscal 2023 increased by 5.9% compared with that year.



Changes in Demand for E-Scrap Recycling Business Due to Shift to Recycling-Oriented Society (Smelting and Resource Recycling Business)

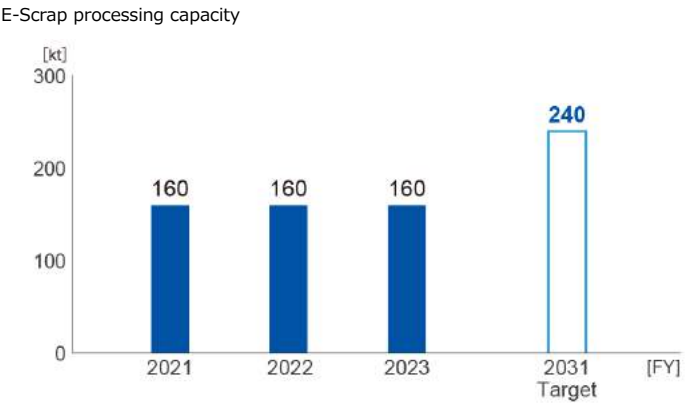
● Opportunity factor: Increase in demand for E-Scrap recycling

Anticipated world and business impact	<p>Increase in demand for recycling waste electronic equipment in line with economic growth in each country</p> <ul style="list-style-type: none"> Estimated global E-Scrap generation, based on global GDP growth and population change, will increase 1.4 times by fiscal 2031 and 2.5 times by fiscal 2051 compared to fiscal 2021. Despite the risk of a decrease in the amount of valuable metals recovered due to a decline in the grade of valuable metals in E-Scrap, the amount of valuable metals recovered when we process 240,000 tons of E-Scrap will be 1.9 times the fiscal 2021 level. 		
Impact analysis	<p>Global E-Scrap generation in fiscal 2031 will be 1.4 times higher than in Fiscal 2021. There is a risk of a decline in the grade of valuable metals in E-Scrap leading to a decrease in the amount recovered, and a risk of difficulties in collecting E-Scrap due to successive entries into the E-Scrap market by competitors and international moves to lock in resources. However, increasing our recycling capacity will increase our E-Scrap processing volume and provide an opportunity to increase our sales.</p>		
	<div>Business impact assessment</div> <div>↑</div> <div>Opportunity: Medium</div>		
Indicator	E-Scrap processing capacity	Target	End of fiscal 2031 240,000t
Future strategies and responses	<ul style="list-style-type: none"> To meet the growing demand for recycling due to the increased amount of E-Scrap generated, enhance E-Scrap processing capacity by constructing a recycling yard and strengthening the system for efficiently recovering the trace elements in E-Scrap. Enhance the functions of the Mitsubishi Materials E-Scrap Exchange (MEX) platform for E-Scrap trading to improve customer convenience and increase E-Scrap collection, thereby contributing to the creation of a recycling-oriented society. 		

Fiscal 2023 performance against target

■ E-Scrap processing capacity

E-Scrap processing capacity in fiscal 2023 marked no change from fiscal 2021, standing at 160,000 tons. To reach our target of 240,000 tons by fiscal 2031, we plan to construct a new recycling yard in Onahama in fiscal 2024, and will engage in construction work to increase processing capacity in Naoshima in fiscal 2025.



Changes in Demand Related to Home Appliance Recycling (Smelting and Resource Recycling Business)

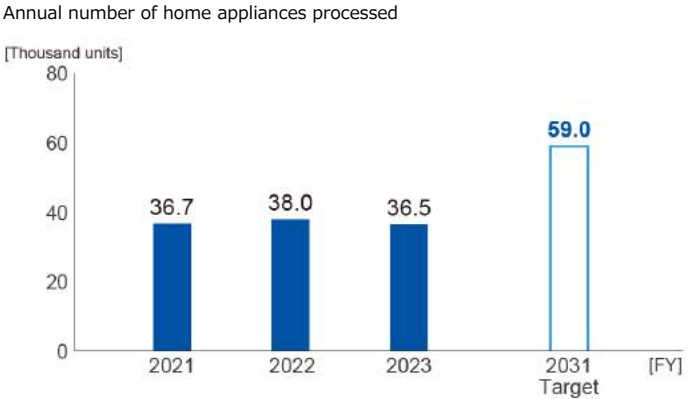
● Opportunity factor: Increase in demand for home appliance recycling

Anticipated world and business impact	<p>Increased frequency of replacement with more energy-efficient appliances due to global warming and rising energy costs</p> <ul style="list-style-type: none"> The total weight of waste home appliances disposed of in Japan will increase 1.1 times by fiscal 2031 and fiscal 2051 compared to fiscal 2021, due to an increase in the number of air conditioners owned per household, changes in the number of households, changes in the frequency of replacement due to breakdowns, and changes in the rate of home appliance collection due to recycling regulations, etc.
Impact analysis	<p>The amount of waste home appliances is expected to increase due to rising temperatures, changes in the number of households, and stricter carbon and recycling regulations. This will result in an increase in our appliance processing volume, which, based on our business size projections, will provide an opportunity to increase sales by 1.4 by fiscal 2031 compared to fiscal 2021.</p> <div> <div>Business impact assessment</div> <div> <div>↑</div> <div>Opportunity: Medium</div> </div> </div>
Indicator	<div>Annual number of home appliances processed</div> <div>Target</div> <div>End of fiscal 2031 5.9 million units</div>
Future strategies and responses	<ul style="list-style-type: none"> Contribute to building a recycling-oriented society by expanding business through M&A of existing plants and establishment of new recycling plants. In addition to automation and labor saving, we will differentiate ourselves by strengthening management through a cloud-based operation management system, and visualizing environmental value through LCA evaluations.

Fiscal 2023 performance against target

■ Annual number of home appliances processed

The annual number of home appliances processed in fiscal 2023 declined by 4.2% compared with fiscal 2022 to 3.65 million units, reflecting a fall in the number of units received in a reactionary decline from higher home appliance replacements due to the pandemic-driven expansion of stay-at-home demand in the previous years.

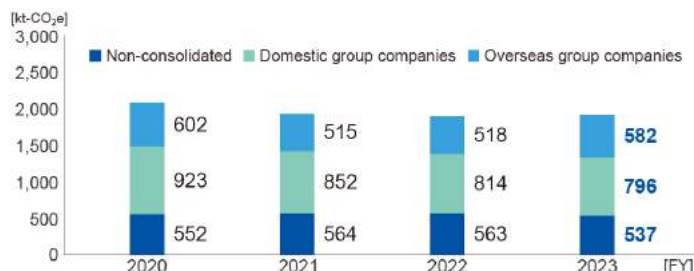


GHG Emission Results and Initiatives

Fiscal 2023 Reduction Activities

■ Total Greenhouse Gas Emissions (non-consolidated + main consolidated subsidiaries)

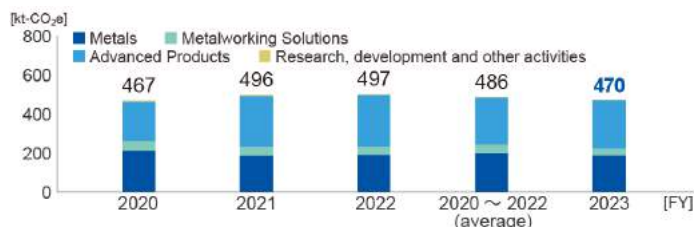
Total greenhouse gas emissions (non-consolidated + main consolidated subsidiaries) for the Group in fiscal 2023 was 1,916 thousand tons★. Which was a decrease of 21 thousand tons compared to fiscal 2022.



* As CO₂ emissions derived from non-energy sources are mainly waste products and are difficult to reduce, we target CO₂ emissions derived from energy sources where reduction efforts through energy conservation can be verified.

■ Greenhouse Gas Emissions Derived from Energy Sources (non-consolidated)

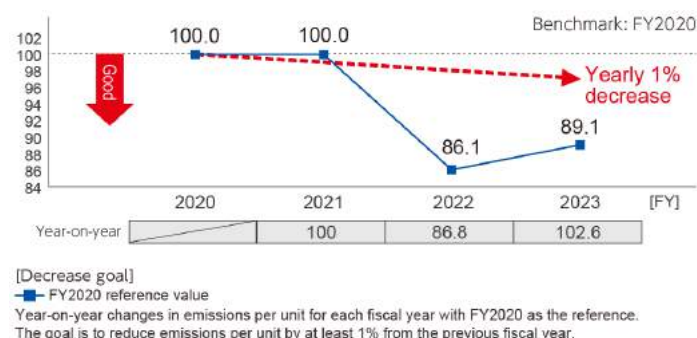
In fiscal 2023, our non-consolidated greenhouse gas emissions from energy sources were 470 thousand tons. It decreased by 27 thousand tons compared to fiscal 2022.



* Greenhouse gas emissions derived from non-energy sources comes mainly from limestone, which is used as a raw material. As it is difficult to substitute or reduce volumes of limestone, however, our emissions target covers greenhouse gas emissions derived from energy sources, which can be reduced by energy saving initiatives.

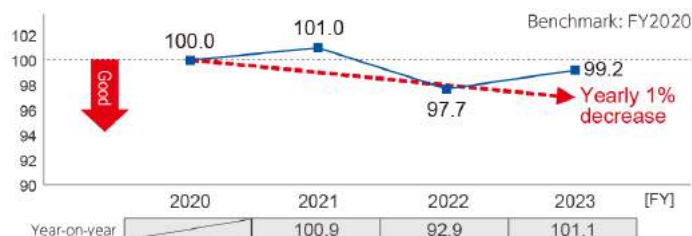
■ Changes in Greenhouse Gas Emissions per Unit (non-consolidated)

The non-consolidated GHG emissions were reduced by 26,000 tCO₂ (-5%) from the fiscal 2022 level. emissions per unit of production deteriorated slightly due to the Naoshima Smelter & Refinery's furnace repair year and a decrease in production at some plants.



■ Changes in Energy Consumption per Unit (non-consolidated)

Energy consumption on a non-consolidated basis decreased by 4.9% compared to fiscal 2022. Unit energy consumption deteriorated by 1.1% due to the Naoshima Smelter & Refinery's furnace repair year and a decrease in production at some plants. Business Classification Evaluation: Class S (Class S: Unit requirement improved by 1% or more on average over the past five years)



[Decrease goal]

■ FY2020 reference value

Change in each year's intensity compared to the previous year's intensity based on the 2019 intensity. The target is to reduce intensity by 1% or more from the previous year.

This intensity is calculated based on the calculation method of the Energy Conservation Law.

* Energy consumption per unit is calculated in accordance with the periodic report guidelines prescribed under Japan's Act on the Rational Use of Energy (Energy Conservation Act). As the Company's business is diverse, we identify a "value intimately related to energy use" for each business and use it as the denominator for calculations. We calculate each business's contribution by multiplying the year-on-year of each business's energy consumption per unit with that business's share of the Company's total energy use. The product is the Company's total consumption per unit (year-on-year). Greenhouse gas emissions per unit is calculated in the same way.

* In the periodic report on fiscal 2023 results prescribed under Japan's Act on the Rational Use of Energy, the Yokkaichi Plant and Yokkaichi Plant Suzuka Office were excluded from the calculations. However, the values in this table were calculated by including these two business locations.

■ Breakdown of Total Emissions for Fiscal 2023 [kt-CO₂e]

Category			Non-consolidated	Domestic group companies	Overseas group companies	Total
Scope1 (direct)	From energy sources (fuel, etc.)		109	337	149	595
	From non-energy sources	From processes	0	0	0	1
		From waste	60	225	0	285
		Greenhouse gases other than CO ₂	7	31	0	38
	(Reference) Total from non-energy sources		67	256	0	323
	Subtotal		176	593	149	★919
Scope2 (indirect) ^{*1}	From energy sources (power, etc.)		361	203	433	★997
(Reference) Total from energy sources			470	540	582	1,592
Total			537	796	582	★1,916

* "Group companies" includes 91 consolidated subsidiaries (38 domestic, 53 overseas).

* As emission factors, the adjusted emission factor of power companies was used for power in Japan, the emission factor published by the International Energy Agency (IEA) was used for power in other countries, and values based on the Act on Promotion of Global Warming Countermeasures were used for fuels and steam.

* Scope2 (Indirect)*¹ emissions are market-based emissions. Location-based Scope2 emissions are 1,031 kt-CO₂e.

■ Scope 3 Emissions for Fiscal 2023 [kt-CO₂e]

Item		Object	Non-consolidated	Group	Total	Approach to determining the amount of activity
Category 1	Purchased goods and services	Same as organizations covered by environmental data other than greenhouse gas emissions	1,075	2,921	3,995	The use of raw materials accepted from outside the Group (excluding waste as raw materials and by-products as raw materials) and water intake in terms of physical quantity
Category 2	Capital goods	Same as consolidated financial statements	125	159	284	Capital expenditure in the reportable fiscal year
Category 3	Fuel and energy-related activities not included in Scopes 1 and 2	Same as organizations covered by data on greenhouse gas emissions	94	135	229	Fuel consumption by type and volume of electric power and steam purchased from outside the Group
Category 4	Upstream Transportation and Distribution	Same as organizations covered by environmental data other than greenhouse gas emissions	241	510	751	<p>1) Emissions from the physical distribution of products and services, which were purchased in the reportable fiscal year, from suppliers to the company</p> <ul style="list-style-type: none"> • A transportation scenario was set for each major raw material (excluding waste as raw materials and by-products as raw materials). • Distances between countries were set using the IDEA database on distances between countries, and other distances were set using a distance search site (with distance given by an in-house company in a questionnaire adopted in some cases). <p>2) Emissions from the physical distribution of products that were shipped and transported in the reportable fiscal year at the expense of the company</p> <ul style="list-style-type: none"> • A transportation scenario was set for each major shipped product. • Distances between countries were set using the IDEA database on distances between countries, and other distances were set using a distance search site.
Category 5	Waste generated from operations	Same as organizations covered by environmental data other than greenhouse gas emissions	4	20	25	The amount of industrial waste (waste recycled into resources and landfilled waste) was included.

Category 6	Business Travel	Consolidated	0	2	3	For Mitsubishi Materials (non-consolidated), the number of employees at each base (plants and offices) was used for the calculation. For consolidated subsidiaries, the number of employees of each in-house company from human resources information given in the securities report was used for the calculation.
Category 7	Employee commuting	Consolidated	2	7	8	For Mitsubishi Materials (non-consolidated), the number of employees at each base (plants and offices) was used for the calculation. For consolidated subsidiaries, the number of employees of each in-house company from human resources information given in the securities report was used for the calculation.
Category 8	Upstream Leased Assets	—	—	—	—	While there are leased assets, they were excluded from the calculation because they are included in Scope 1 and Scope 2.
Category 9	Downstream Transportation and Distribution	Same as organizations covered by environmental data other than greenhouse gas emissions	47	136	183	Emissions from physical distribution of products that were shipped and transported to sales destinations at the expense of other companies. Transportation from sales destinations to final consumers was excluded. Distances between countries were set by using the IDEA database on distances between countries, and other distances were set by using a distance search site (with the distance given by an in-house company in a questionnaire adopted in some cases).

Category 10	Processing of sold products	Same as organizations covered by environmental data other than greenhouse gas emissions	116	334	449	For products sold, the value for the amount of products shipped by each in-house company to companies other than group companies was regarded as the value for the amount of activity. Emissions from processing were calculated by setting the primary processing assumed for each product.
Category 11	Use of sold products	—	—	—	—	Products sold were excluded from the calculation because they are materials and parts that are used by a wide range of users and it is therefore difficult to follow their paths to final products.
Category 12	End-of-Life Treatment of Sold Products	Same as organizations covered by environmental data other than greenhouse gas emissions	2	3	5	For products sold, the value for the amount of products shipped by each in-house company to companies other than group companies was regarded as the value for the amount of activity. Emissions from disposal were calculated by setting a disposal method assumed for each product.
Category 13	Downstream Leased Assets	—	—	—	—	Leased assets were excluded because virtually no such asset is owned.
Category 14	Franchises	—	—	—	—	Franchising business was excluded because the company does not operate such a business.
Category 15	Investments	Affiliates accounted for by the equity method	6,038	0	6,038	Scope 1+2 emissions and share of Scope 1+2 emissions of equity method affiliates in the reporting year
Total			★7,745	4,227	★11,972	

* Raw material procurement, transportation, and product shipment scenarios were set based on fiscal 2022 results.

* The calculation was made by referring to the Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain Ver. 2.4 from the Ministry of the Environment and the Ministry of Economy, Trade and Industry. Greenhouse gas emissions per unit was calculated by referring to the emission intensity database for calculating greenhouse gas emissions of an organization through the supply chain (ver. 3.3) and National Institute of Advanced Industrial Science and Technology IDEA Ver. 3.3 from the above ministries.

* Scope 3 emissions for fiscal 2023 reflect data on Mitsubishi Materials Corporation (including the polycrystalline silicon business that has been transferred) and 49 consolidated subsidiaries (including Diasalt Corporation) as of March 31, 2023.

■ Principal Initiatives at Each Business

We regard it as a top priority to save energy wherever possible at our manufacturing facilities and plants. That is why we are so committed to energy saving activities. Specific activities include switching fuels, making effective use of untapped energy, upgrading processes and equipment, installing high-efficiency equipment, optimizing device specifications, and reviewing equipment controls and operating practices. We are constantly working to save energy at smaller facilities, too, including Head Office, branches, sales offices and research facilities, through measures such as installing LED lighting.

CO₂ emissions from transportation in fiscal 2023 were 18,109 tons (down 425 tons from the previous fiscal year) for the parent Company and 12,564 tons (up 859 tons from the previous fiscal year) for the Group companies in total due to an increase in transportation volume mainly by ship. The total CO₂ emissions of the parent Company and Group companies amounted to 30,673 tons (up 434 tons from the previous year). On the other hand, unit energy consumption* for the parent Company was 22.47 kℓ/million ton-kilometer (down 4.65% from the previous year), while the combined total of the parent Company and Group companies was 20.47 kℓ/million ton-kilometer (up 5.31% from the previous year). We will continue to strive to save energy in transportation by promoting modal shifts and improving loading rates, and through Group-wide logistics optimization, we aim to build a logistics system that reduces environmental impact through the use of non-fossil energy.

■ CO₂ Emissions According to Mode of Transport (Unit: Tons CO₂)

			FY 2022			FY 2023		
			Mitsubishi Materials	Group companies	Total	Mitsubishi Materials	Group companies	Total
CO ₂ emissions from logistics	Total		18,533	11,704	30,237	18,109	12,564	30,673
	Breakdown	Road	10,666	4,989	15,655	11,103	4,936	16,039
		Ocean	7,809	6,712	14,521	6,960	7,625	14,585
		Rail	20	3	23	12	3	15
		Air	38	0	38	35	0	35

* Value obtained by converting energy consumption into crude oil (kl) and dividing it by transportation in ton-kilometers (million ton-kilometers)

Developing and Promoting the Use of Renewable Energy

Initiatives to Build a Decarbonized Society

Products and Services that Contribute to Building a Decarbonized Society

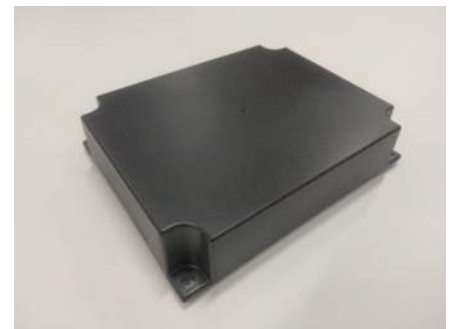
For the Group, tackling climate change has been one of its most important management issues for building a decarbonized society. Reflecting this, the Group has been approaching manufacturing with a view to reducing the environmental impact and has developed and promoted the use of renewable sources of energy, such as geothermal energy.

TOPICS

“Fire-Resistant Plastic,” a New Lightweight Fire-Resistant Material That Will Not Burn or Melt When Exposed to Flames

In recent years, lithium-ion batteries (LIBs) for electric vehicles (EVs) have become increasingly dense, increasing the risks in case of LIBs catching fire. At the same time, there are demands for vehicle bodies to be made lighter in order to extend their range. Plastic materials are used in various products to reduce weight, and today flame-resistant plastics are widely marketed for their fire proof properties. However, conventional flame-retardant plastics have difficulty withstanding hot fires, and metal continues to be used in components where safety is a priority, and this has been hindering progress in weight reductions.

Mitsubishi Materials Corporation has developed a technology that achieves an easily moldable “fire-resistant plastic” that does not burn or melt easily when exposed to flames while being lightweight. When used in components such as the LIB case lid in an EV, it is expected to prevent a fire from spreading in the event of ignition. Going forward, we will pursue the commercialization of products that utilize this technology.



Molded fire-resistant plastic

TOPICS

Creation of a High-efficiency Thermoelectric Power Generation Technology, an Innovative Thermal Management Technology

Thermoelectric power generation technologies* which make effective use of unused and waste heat are expected to undergo widespread adoption to achieve carbon neutrality. To achieve significant greenhouse gas (GHG) reduction effects at a low energy generation cost, thermoelectric power generation elements and modules with a high conversion efficiency are needed.

Mitsubishi Materials Corporation has implemented a unique material design that differs from conventional approaches and used environmentally friendly materials in an effort to create a thermoelectric power generation technology with performance that surpasses conventional approaches while featuring high long-term reliability, and has been pursuing development aimed at achieving a conversion efficiency on par with solar power generation. If this technology is practically implemented, it could be deployed for a wide range of applications from equipment management at factories to vehicles and IoT communications equipment, and is expected to enable functions that have traditionally proven difficult, such as driving electrical equipment and selling electricity to the grid through thermoelectric generation alone. We will continue to pursue business development with the aim of achieving practical utilization of this innovative thermal management technology.



Thermoelectric power generation module

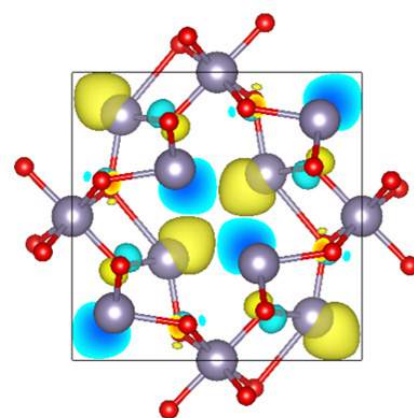
* Thermoelectric Power Generation Technologies: Technologies that utilize temperature differences to convert thermal energy into electrical energy.

TOPICS

Successfully Synthesizing a New Tin Oxide Exhibiting Photocatalytic Properties in Visible Light

In joint research, a research group led by Professor Miyauchi of the Tokyo Institute of Technology that includes Mitsubishi Materials Corporation and Associate Professor Tanabe of the National Defense Academy successfully synthesized an orthorhombic tin tetraoxide (Sn_3O_4), a tin with a new crystalline structure, and managed to determine the mechanism of its functional expression by first-principle calculations.

Low cost and stable semiconductors that exhibit photocatalytic properties to absorb visible light are essential for the practical utilization of artificial light synthesis, and monoclinic Sn_3O_4 had been reported as one such semiconductor. However in this research, the hitherto unreported orthorhombic Sn_3O_4 was synthesized using a simple hydrothermal method. This orthorhombic Sn_3O_4 is able to absorb a wider range of visible light than conventional tin oxide, and due to its high conduction band level and strong excited electron reducing capacity, it functions as a photocatalyst able to reduce carbon dioxide. The research also found that control of the hydrothermal synthesis conditions made it possible to create different crystalline polymorphs. This knowledge is expected to lead to the synthesis of crystalline polymorphs and new materials other than as yet unreported tin oxides.



Crystalline structure and electron structure of orthorhombic

Sn_3O_4 Source: Y.S. Liu, et al., Angew.

Chem. Int. Ed. 2023, 62, e202300640

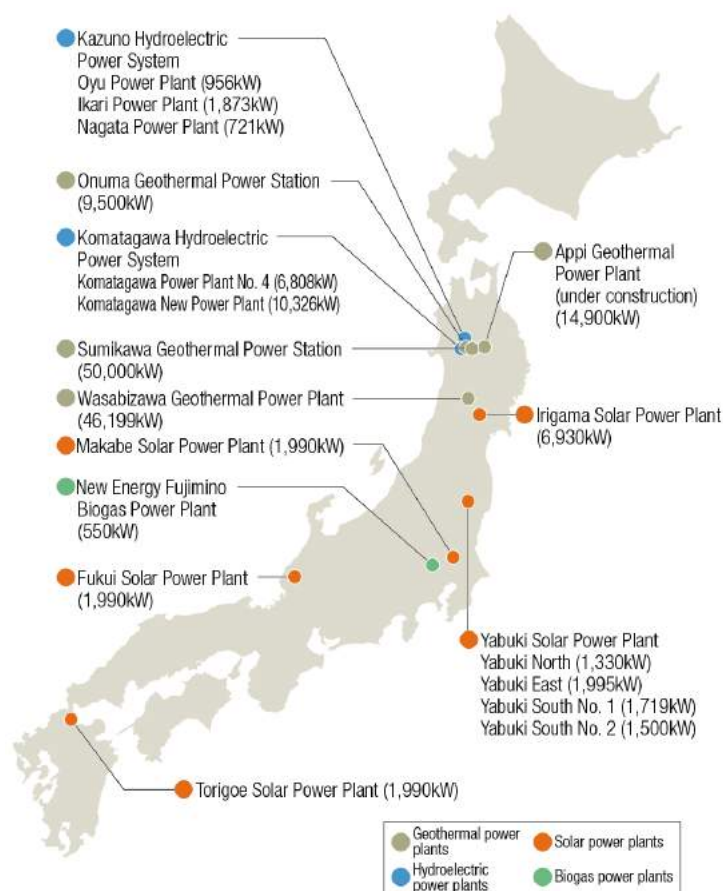
Endorsement of the Ministry of Economy, Trade and Industry (METI)'s GX League Basic Concept

We have endorsed the GX League Basic Concept announced by the Ministry of Economy, Trade and Industry since April 2022, and later in 2023 submitted a note of confirmation aimed at participation in the GX League Emissions Trading Scheme (GX-ETS). The GX League was established as a forum where companies actively engaged in GX (Green Transformation), together with government agencies, universities, public research institutions, financial institutions, and other players taking up the challenge of GX, can work as one to discuss the transformation of the entire economic and social system and to practice the creation of new markets. The GX Forum was established to provide a forum for discussion and practice for the creation of new markets for the transformation of the entire economic and social system. Participating companies are expected to play a leading role in the realization of carbon neutrality, not only through their own efforts to reduce emissions, but also by collaborating with a wide range of actors, including supply chain companies, consumers, and civil society. We are also involved in efforts to reduce emissions, including encouraging companies in our supply chain to do so. In the process of discussions toward the establishment of an emissions trading system (GX-ETS) promoted by the GX League, we are also providing comments and opinions to help make the system even better.

▶ [GX League Basic Concept \(METI\)](#)

Producing Renewable Energy

We have been developing renewable energy sources to supply the electricity needed for our mines and smelters. To date, we have been promoting the creation of renewable energy sources, mainly geothermal and hydroelectric power generation, in order to provide a stable supply of energy with minimal environmental impact, utilizing the expertise we have accumulated.



Geothermal Power Generation Business

■ Activities for the Stable Operation of Existing Power Plants

We stably generate environmental loading-reducing electric power through our Onuma Geothermal Plant and Sumikawa Geothermal Power Station (steam supply only, power generated by Tohoku Electric Power Co., Inc.), both in the Hachimantai area of Kazuno, Akita prefecture, as well as the Wasabizawa Geothermal Power Plant (owned by Yuzawa Geothermal Power Corporation, established jointly with Electric Power Development Co., Ltd. and Mitsubishi Gas Chemical Company, Inc.), which began commercial operation on May 20, 2019 in the Takamatsu and Akinomiya areas of Yuzawa, Akita prefecture. In fiscal 2023, we generated a total of 604 GWh of power (including 322 GWh from plants in which we have equity stake, etc.). The operation of our geothermal plants and steam supply systems effectively reduced CO₂ emissions by approx. 136,000 tons (calculated based on emissions from Sumikawa Geothermal Power Station of Tohoku Electric Power Co., Inc. and our equity stake in Wasabizawa Geothermal Power Plant of Yuzawa Geothermal Power Corporation).

In geothermal power generation, it is important to understand the unseen underground conditions to ensure a continuous and stable supply of steam. At the Sumikawa geothermal power plant, we will continue to monitor the underground conditions through detailed verification of data since the start of operation and reanalysis of the geological structure in order to improve the amount of electricity generated and continue stable operations at the site. We are working to maintain a geothermal reservoir at the Sumikawa Geothermal Area, with the aim of increasing the amount of power generated in the future. We have been verifying data in detail, and reanalyzing geothermal systems since we started operations at the site, as we continue to focus on maintaining stable operations.

■ Activities for New Geothermal Development

In addition to operating these geothermal plants, we are currently working on new projects, too. Yuzawa Geothermal Power Corporation, established jointly with Electric Power Development Co., Ltd. and Mitsubishi Gas Chemical Company, Inc. started construction of Wasabizawa Geothermal Power Plant in May 2015 and began commercial operation of this plant on May 20, 2019. In October 2015, we established Appi Geothermal Energy Corporation in conjunction with Mitsubishi Gas Chemical Company, Inc. We were joined by Electric Power Development Co., Ltd. in June 2018. The three companies are promoting commercialization and started construction in August 2019. In August 2021, we launched a survey to quantify the geothermal resources in the Komonomori area (Kazuno), which is located northeast of the Onuma Geothermal Power Station, using subsidies from the Japan Oil, Gas and Metals National Corporation (JOGMEC). Further, we have begun a survey to quantify the geothermal resources in the upstream area of the Appi River (Hachimantai), which is east of the Appi Geothermal Power Plant, in June 2022 using subsidies from JOGMEC. Additionally in May 2022, we invested in Hakodate Esan Geothermal G.K., which is conducting geothermal surveys and development in the Esan area (Hakodate) and are involved in the construction of a geothermal power plant with RENOVA, Inc. and Daiwa Energy & Infrastructure Co. Ltd., which will begin after the resource surveys and environmental impact assessments have been completed. We are also continuing to conduct joint surveys with other companies in the Azuma-Adatara area of Fukushima prefecture.



Wasabizawa Geothermal Power Plant (Akita prefecture)
Main business operator: Yuzawa Geothermal Corporation
Operation commenced in May 2019
Output: 46,199kW



Appi Geothermal Power Plant (Iwate prefecture)
Main business operator: Appi Geothermal Energy Corporation
Operations scheduled to commence in April 2024
Output: 14,900kW

TOPICS

Participation in a New Geothermal Development Project in the Esan Area, Hakodate City, Hokkaido

In May 2022, we have invested in Hakodate Esan Geothermal LLC (Esan Geothermal) as a new business partner of RENOVA, Inc. (Chuo-ku, Tokyo; Founding CEO, Yosuke Kiminami) and Daiwa Energy & Infrastructure Co. Ltd. (Chiyoda-ku, Tokyo; President, Morimasa Matsuda). Since its establishment in 2016, Esan Geothermal has moved ahead with business development with the aim of developing a new geothermal power plant in the Esan area of Hakodate City, Hokkaido.

We are utilizing the abundant experience and high technological capabilities we have cultivated over many years through our development and management of coal and metal mines for hydroelectric and geothermal power generation. In relation to geothermal power generation, since Onuma Geothermal Power Plant (Akita Prefecture) started operation in 1974, we have played a central role in the construction and operation of Sumikawa Geothermal Power Plant (Akita Prefecture, operation started in 1995), Wasabizawa Geothermal Power Plant (Akita Prefecture, operation started in 2019), and Appi Geothermal Power Plant (Iwate Prefecture, operation scheduled to start in 2024).

We have been working on the "development and promotion of the use of renewable energies such as geothermal energy" and intend to engage in this project by making use of our experience and technological capabilities through investment to contribute to the success of the project.



An excavation survey

- ▶ [Participation in a New Geothermal Development Project in the Esan Area, Hakodate City, Hokkaido](#)

Hydroelectric Power Generation Businesses

We have a long history of generating hydroelectric power, dating back to 1898, when we built seven hydroelectric power plants in Akita prefecture, for the purpose of supplying enough power to run Osarizawa Mine (opened as a gold mine, later operated as a copper mine, closed in 1978) and homes in the local area. We were compensated for one of those power plants when a dam was built and the plant was submerged in 2000. The remaining six however are still operating today, selling all of the power that they generate to a power company. Since 2014, we have successfully completed upgrades at three hydroelectric power plants, in an effort to deal with aging facilities. We also completed updates at Oyu Hydroelectric Power Plant (Kazuno) in March 2018. In addition, in May 2019, we began to construct the New Komatagawa Hydroelectric Power Plant in the Komata River system in Kita-Akita City, Akita. It is the first new hydroelectric power plant since the No. 4 Komatagawa Hydroelectric Power Plant, which was completed in 1953. The new plant is scheduled to start operating in December 2022. We also began investigations in multiple places since fiscal 2022, with the goal of constructing new small-scale hydropower plants with an output of around 1,000 kW each. In fiscal 2023, the combined total of power generated by all six hydroelectric power plants was 92 GWh. Our operation of hydroelectric power plants effectively reduced CO₂ emissions by approx. 40,000 tons.



Komatagawa New Power Plant
(Akita prefecture)
Main business operator:
Mitsubishi Materials Corporation
Operation commenced in
December 2022
Output: 10,326kW

Solar Power Businesses

Since 2013 we have been working on a new solar power business, making effective use of idle Group land. By 2017 we had built power plants in five locations as part of a joint venture with Mitsubishi HC Capital Inc. We are currently operating plants in Makabe (Ibaraki prefecture), Fukui, Torigoe (Fukuoka prefecture), Irigama (Miyagi prefecture), and Yabuki (Fukushima prefecture). In fiscal 2023, the combined total of power generated by all five solar power plants was 28 GWh (including 14 GWh from power plants in which we have equity stakes). The operation of these power plants (in which we have equity stakes) effectively reduced CO₂ emissions by approx. 10,000 tons.



Irigama Solar Power Station
(Miyagi prefecture)
Main business operator: LM Sun
Power CO., Ltd.
Operation commenced in January
2015
Output: 6,930kW

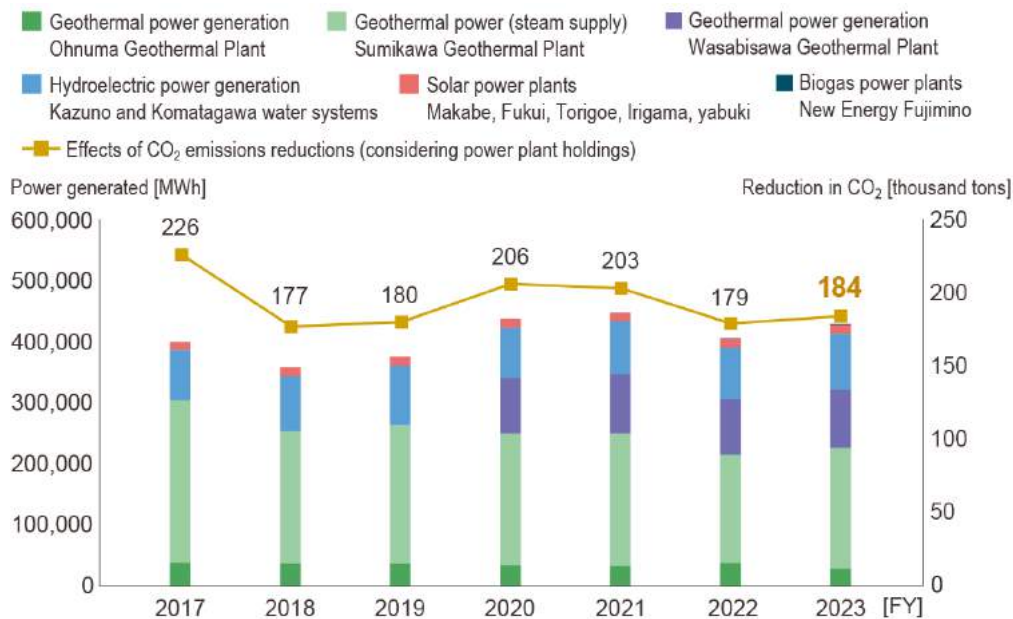
Biogas Power Generation Business

We conduct power generation using biogas obtained from the processing of food waste at New Energy Fujimino Co., Ltd., a consolidated subsidiary established in 2018. The power generation has an output of 550 kW. In the fiscal year 2023, the electricity generated through biogas power generation amounted to 2 GWh (of which our share was 2 GWh).



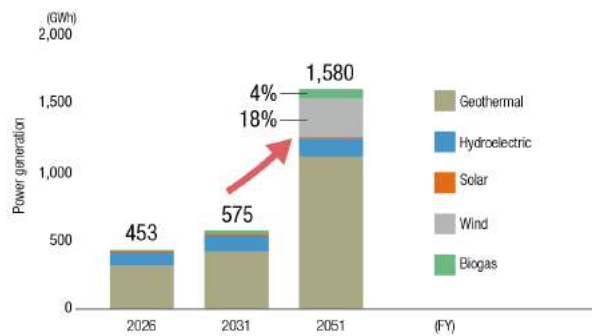
Renewable Energy's Effect on the Reduction of CO₂ Emissions

■ Reduction in CO₂ Emissions Using Renewable Energy (reflecting our equity in power plants)



* Recalculated based on the CO₂ emission factor for commercial electric power defined by METI

Renewable Energy Power Generation Targets and Results



* Steam supply to geothermal power plants (steam sales converted by electric energy volume)

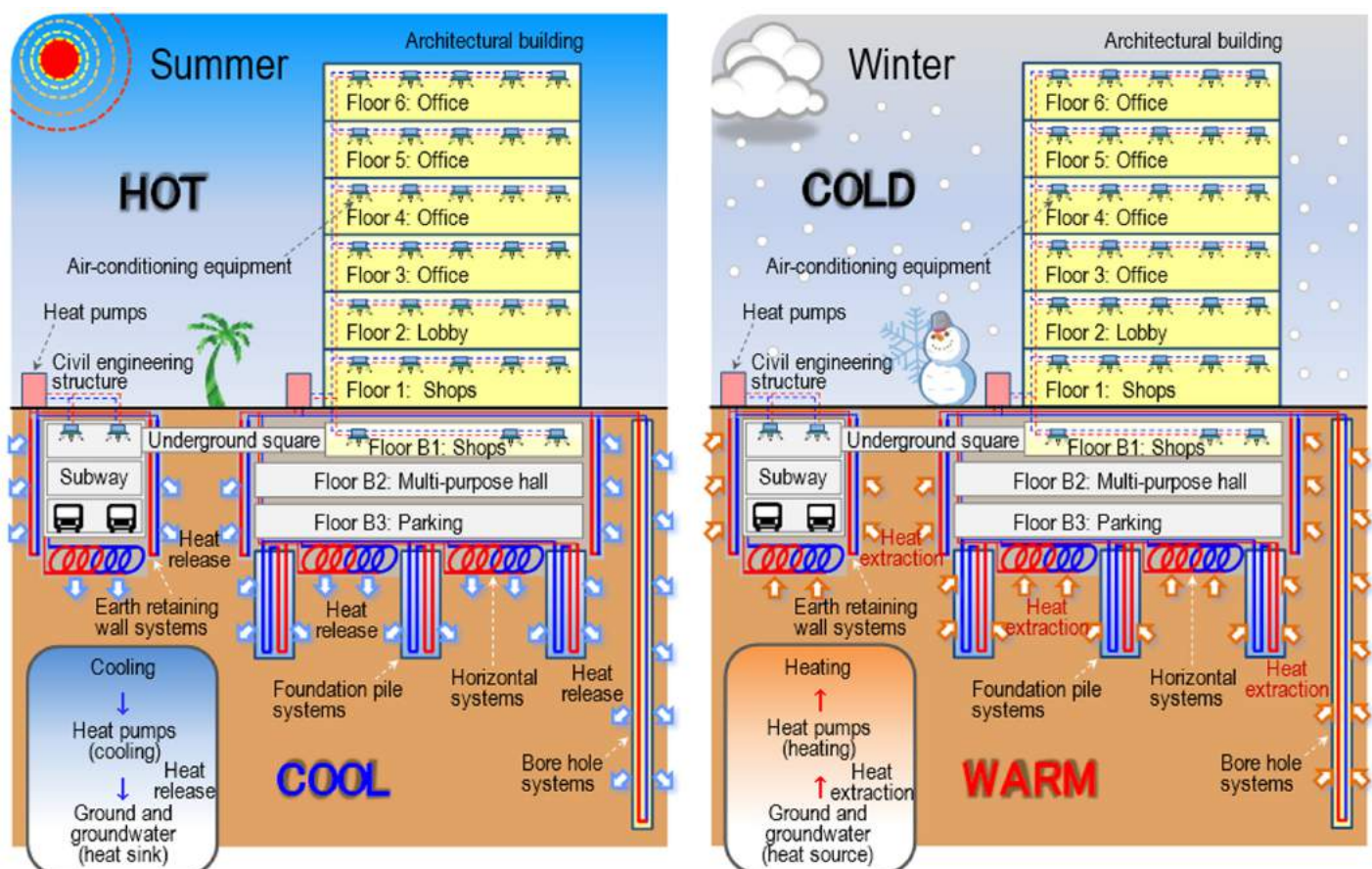
Helping to Build of a Decarbonized Society by Promoting Ground Source Heat Utilization, Which is Renewable Energy Heat.

In 2000, Mitsubishi Materials Techno Corporation entered the business of ground-source heat, which is heat from a renewable energy source, as a provider of total engineering solutions. The company has been providing services in the process from project proposal through investigation, design, construction, and maintenance.





The company has continued its R&D efforts and acquired patented technologies through projects commissioned by the government and others, aiming to become the No.1 company in geothermal technologies. As a result, the company has succeeded in building infrastructure using ground-source heat by developing commercial systems with various heat exchange methods, including not only the common borehole method but also its patented foundation pile method as well as horizontal and earth retaining wall methods. At present, Mitsubishi Materials Techno Corporation is promoting sales of these technologies as systems for using ground-source heat utilized through urban infrastructure, aiming to contribute to smart cities in the future. Approx. 130 systems from the company have been installed. Since 2020, the large-scale utilization of ground-source heat has been increasing. For example, the company completed one of the largest projects in Japan, which combines the borehole method (100 m in depth x 120 boreholes) and the horizontal method (nine units x approx. 100 m long trenches), at a city hospital in Hachimantai. It also completed one of the largest projects in the Tokyo metropolitan area, which applied the foundation pile method (66 cast-in-place piles) at the Yokohama City Hall. In May 2022, Mitsubishi Materials Techno Corporation, the Yokohama City Government, Takenaka Corporation, and other companies received the 60th Gakkai-sho Gijutsu-sho (academic society award and technology award) in the building equipment category from the Society of Heating, Air-Conditioning and Sanitary Engineers of Japan for the implementation of the Yokohama City Hall environmental and facility plans. The company will continue to help establish a decarbonized society by expanding the use of ground-source heat as renewable energy.

▶ [Ground Heat Pump System \(Mitsubishi Materials Techno Corporation\)](#) 

■ Overview of the System for Using Ground-Source Heat Utilized through Urban Infrastructure



■ Heat Exchange Systems and Examples of Projects Which Adopted Them

Bore hole systems	Foundation pile systems	Horizontal systems	Earth retaining wall systems
 <p>Heat supply to the Tokyo Skytree District Sonic drill method Japan's first district heating and cooling system (DHC)</p>	 <p>Patent No. 6452876</p> <p>Adopted for use in more than 20 projects Compatible with cast-in-place piles, precast concrete piles, and steel pipe piles as well</p>	 <p>Patent No. 5624533/ 5859731</p> <p>Quadruple tracking project of Odakyu Electric Railway The first adoption of this technology for a railway tunnel project in Japan Technological Development Projects for Global Warming Countermeasures Scheme by the Ministry of the Environment (FY2011 to FY2012, FY2012 to FY2014)</p>	 <p>Patent No. 5384058</p> <p>NEDO project for developing technologies for using renewable energy (FY2016 to FY2019)</p>

Carbon dioxide Capture, Utilization and Storage (CCUS)

For Carbon dioxide Capture, Utilization and Storage (CCUS)

Concerning carbon dioxide capture and storage, we invested in Japan CCS Co., Ltd., which was established in May 2008. Through Japan CCS, we are participating in the Large-scale CCS Demonstration Project in Tomakomai and Investigation of Potential Sites for CO₂ Storage. Regarding carbon dioxide capture and utilization, we have launched a demonstration test recovering carbon dioxide emitted from the Group's plant. (See the link below for details.)

▶ [Recovering and using CO₂ emitted from plants -- A demonstration launched in Kyushu](#)

* This data is only available in Japanese on the website.

Reducing Environmental Impact and Preventing Environmental Pollution

Environmental Management

Purpose of activities	Activities during fiscal 2023	Self-assessment	Targets/plans for activities from fiscal 2024 onwards
<ul style="list-style-type: none"> Complying with environmental legislation Continuous improvement of environmental load 	<ul style="list-style-type: none"> Strengthen efforts to observe environmental legislation Step up education on environmental legislation 	A	<ul style="list-style-type: none"> Strengthen efforts to comply environmental legislation Step up education on environmental legislation

Self-assessment grades A: Target achieved B: Target mostly achieved C: Target not achieved

Environment Policy

This “Environmental Policy of the Mitsubishi Materials Group” was established based on the Sustainability Policy and is considered to be the foundation for the business activities of the Mitsubishi Materials Group.

1. Promote Recycling and Provide Environmentally Friendly Products

We leverage our advanced recycling technologies to promote recycling of waste. At the same time, we provide environmentally friendly materials and products across our business activities starting from raw material procurement to the development, production, distribution, consumption, disposal and recycling of raw materials and products.

2. Advance Decarbonization

We work towards the decarbonization of our business activities by reducing energy consumption. We will also tap into geothermal and other renewable energy sources to decarbonize our entire value chain.

3. Respect Biodiversity

We engage in business activities that take ecosystems into account throughout our value chain, including the development of natural resources.

4. Effectively Use and Conserve Water Resources

We work to reduce water consumption through circular water management and reuse of cooling water, cleaning water and all other water used across our business activities.

5. Sustainably Manage Company-Owned Forests

We make effective use of timber and other forest resources as well as ensure appropriate management of company-owned forests that contribute to decarbonization, biodiversity and water conservation and recreational activities of the local communities.

6. Encourage Environmental Education and Harmonious Coexistence with Society

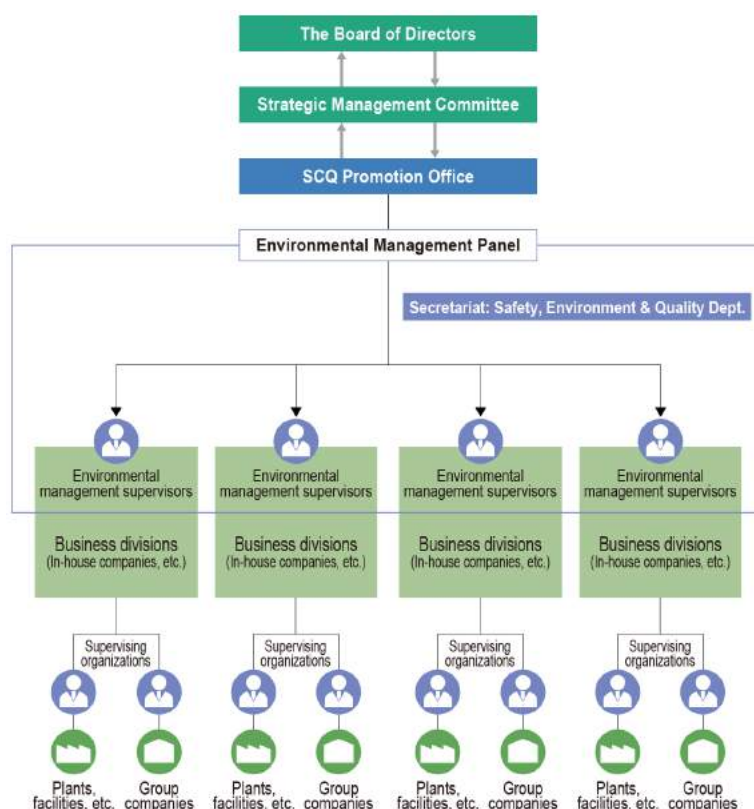
We strive to reduce the environmental impact from our business activities and prevent pollution by educating all our employees on relevant laws, regulations, and agreements on an on-going basis. We communicate proactively with our stakeholders and engage in environmental conservation initiatives.

(Last revised date: December 1, 2021)

Promotion System

We have established the Environmental Management Panel to be a dedicated subcommittee under the SCQ Promotion Office that formulates and implements Group-wide environmental measures. We appoint environmental management supervisors for each business division and manufacturing site. They work to prevent pollution and ensure compliance with environmental laws and regulations by collaborating closely with the Head Office environmental management department.

■ Environmental Management System



Environmental Management Activities

Environmental Training

We operate environmental management systems under the ISO 14001 standard and other environmental management systems at our sites. Under those systems, we engage in continuous activities to ensure compliance with laws and regulations and improve our environmental performance. We have worked to develop and implement environmental training programs and legal checking systems to cultivate managers who possess knowledge of environmental technologies, laws and regulations. In particular, the Group regards waste management as a key business process and promotes the use of recycled raw materials, such as in our metal smelting and refining business. We appoint staff who are responsible for waste management and those in charge of practical operations at each facility. We provide training on laws and regulations and apply strict operating rules in our efforts to ensure appropriate waste management and compliance with relevant laws and regulations. We provide education for staff responsible for waste management with the aim of understanding waste risks and the roles required by introducing the latest case studies on waste management. For staff in charge of practical operations, we organize seminars for understanding the specific regulations of the Waste Management and Public Cleansing Act.

■ Environmental training achievement in Fiscal 2023

		Attendance
Waste management training	Managers	16
	Operational personnel	121

Sharing Information to Address Environmental Issues

To handle the environmental issues that arise at our sites, we have established an office providing the consultation services of staff specialized in environmental issues, at our Head Office. This office provides detailed support, ensures that useful information is shared between the Head Office and other sites, and responds to environmental issues.

We hold an annual Meeting of Administrative Managers Responsible for Environmental Management for management-level staff at our facilities. At these meetings, we share information about environmental measures and issues. In addition, we give annual site tours for environmental management supervisors. These tours are opportunities to learn methods of operating onsite related to environmental management and initiatives for preventing environmental accidents, and to exchange information with supervisors from other sites.

Compliance with Environmental Laws and Regulations

We keep all our sites up to date on changes in legislation applied to the Mitsubishi Materials Group by providing information via intranet or email. In the event of major revisions or revisions requiring measures such as equipment upgrades, we hold explanatory meetings to share information on the requisite measures and ensure that all our sites are prepared to take appropriate action.

Current laws and regulations are checked periodically at each site. In addition, the Internal Audit Department checks the status of compliance with environmental laws and regulations, how chemical substances are handled, how equipment is managed and so on. When a noncompliance is discovered we correct it promptly and share information about it with related sites as part of our efforts to improve the level of management in the overall Group.

In the event of installation of new facilities, facility upgrades/changes, or any other projects involving new operations above a certain scale, individual sites as well as relevant Head Office divisions determine what notifications they are required to submit. In addition, to support specialized legal knowledge that is needed at sites, we built a web system and began operating it in April 2021. When a name or the specifications of a facility are entered in this system, it automatically judges whether a notification or a permit application needs to be submitted.

Status of Compliance with Environmental Laws and Regulations

With regard to our compliance with environment-related laws and regulations in fiscal 2023, including water pollution, air pollution and waste disposal, we were not subject to any adverse dispositions (revoked permits, orders to cease operations, orders to stop use of equipment, fines, etc.) by regulatory authorities.

We received 5 complaints regarding odors and waste. For all of these we promptly investigated the causes and implemented the necessary countermeasures.

Addressing Environmental Risks

In accordance with its Environmental Policy, the Mitsubishi Materials Group identifies environmental risks it faces and takes measures to prevent such risks from materializing.

Pollution of air, bodies of water, soil or groundwater by hazardous substance leaks, or inadequate treatment of industrial waste could have a detrimental impact on the environment, as well as a serious impact on our business activities as a group. We carry out risk assessments in line with the nature of our business activities, the substances that we handle, and the locations of individual sites, and take action as necessary. In addition to preventing inadequate waste treatment at our own departments, we take steps to ensure that we do not overlook inadequate treatment by contractors by taking measures including on-site confirmation.

At the closed mines (non-ferrous metal mines) we own, in order to prevent mining-induced pollution, we continue to maintain tailings dams, mining tunnels and mining water conduit, and to appropriately process acid wastewater containing heavy metals generated from these locations. Biodiversity is also an important environmental risk for us. At the mines from which we procure raw materials (such as ores), we have established environmental and social standards, including standards for the conservation of biodiversity, and we confirm our compliance with these standards. In addition, we manage the company-owned forests in Japan to ensure a high level of ecosystem services from them. They fulfill a certain standard that has been assured by our acquisition of a forest certification.

To reduce climate change risks, we take multiple approaches for the conservation of energy and the reduction of CO₂ emissions. We also study CO₂ capture and use, and generate renewable energy. Regarding the risk that a shortage of freshwater resources could impact our business activities, we conduct risk assessments for our major facilities in Japan and overseas and take measures including the effective utilization of seawater, water conservation through the improvement of the efficiency of the production process, water recycling, and ensuring that wastewater is treated and purified.

Environmental Accounting

In fiscal 2023, we invested approximately 13.1 billion yen in areas including construction at the Tohoku Power Service Station of the Komatagawa New Power Plant (hydroelectric power plant) certified as a renewable energy power generation facility, and the renewal of equipment at copper smelting and refining plants, with the goal of preventing air pollution and water pollution. Costs associated with environmental preservation came to around 6.4 billion yen, including environmental measures, and maintenance and management of equipment to prevent pollution.

Spending on Environmental Preservation in FY2023[Millions of yen]

Category		Investment Amount	Expense Amount
Business area costs	Business area costs	13,019	6,012
	Pollution prevention costs	1,493	2,884
	Global environmental conservation costs	11,495	298
	Resource recycling costs	31	2,830
Upstream/downstream costs		0	0
Administration costs		57	231
R&D costs		25	53
Social activity costs		0	0
Environmental remediation costs		5	104
Total		13,106	6,400

* Calculations of environmental costs are based on the 2005 version of the Environmental Accounting Guidelines published by the Ministry of the Environment.

* Figures refer to Mitsubishi Materials on a non-consolidated basis.

Overall Environmental Impact

INPUT



Total Energy Input★

» **10.0** PJ
(Equivalent to 0.26 million kiloliters of crude oil)



Raw Material Input★

» **1.3** million t
(Volume of incoming recycled resources: 0.2 million t)



Water Intake★

» **94.7** million m³
(Salt water: 83.4 million m³)
(Fresh water: 11.4 million m³)
(All values above are on a non-consolidated basis)

OUTPUT



Greenhouse Gas Emissions★

» **537** thousand t CO₂ equivalent
(SCOPE1,2)



Emissions into the Air and Bodies of Water★

» Airborne emissions
SOx: **882** t NOx: **220** t
» Water emissions
BOD: **173** t COD: **22** t Nitrogen: **144** t



Water discharged★

» **94.9** million m³
(Discharged into sea: 85.3 million m³)
(Discharged into other bodies of water: 9.5 million m³)



Volume of Industrial Waste★

» **11.3** thousand t
(6.6 thousand t of which was recycled)



Chemicals Released or Transferred★

» Released: **41** t Transferred: **37** t

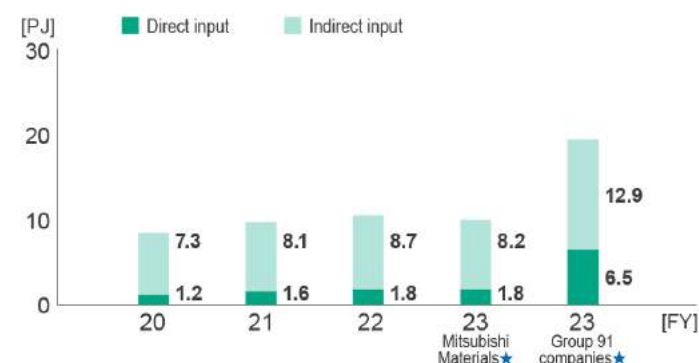
(All values above are on a non-consolidated basis)

Among the following disclosure items, energy input includes data from sites belonging to the polycrystalline silicon business and salt manufacturing business.

Total Energy Input

Total energy input (non-consolidated) in fiscal 2023 decreased by 5% (0.5 petajoules: crude oil equivalent of 13 thousand kiloliters) in comparison with fiscal 2022. This was partly due to a decrease in production at some plants, but also because of energy-saving activities such as the electrification of facilities and the introduction of high-efficiency equipment.

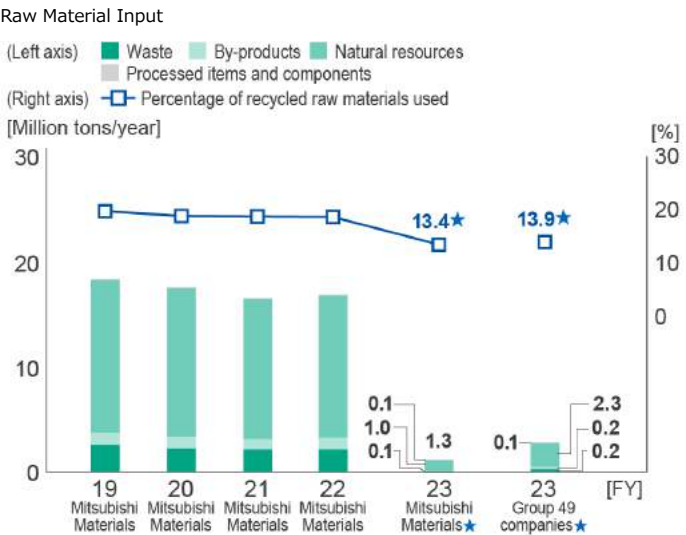
Total Energy Input



* 1PJ = 10¹⁵J = 1,000TJ

Raw Material Input

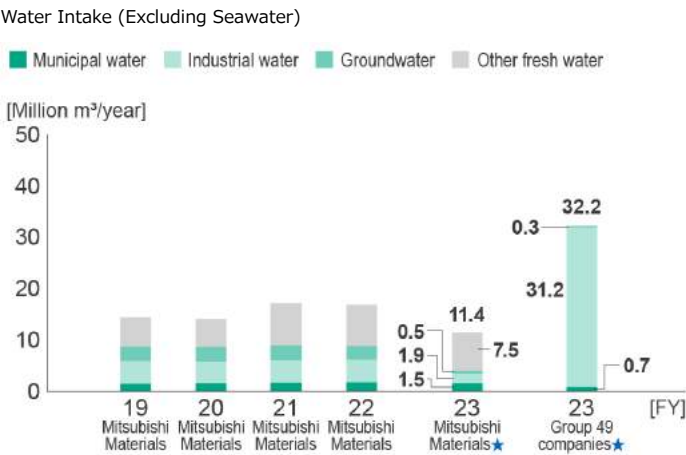
To contribute to the establishment of a material-cycle society, we are actively engaged in the recycling of waste and by-products, and promote the use of recycled raw materials such as waste and by-products. Total raw material input for the Company on a non-consolidated basis for fiscal 2023 declined 93% compared with fiscal 2022 to 1.3 million tons because the cement business was removed as a reporting entity from fiscal 2023. As a percentage of total raw material input, waste products and byproducts accounted for 13.4%.



* Natural resources include limestone procured from Group mines up to fiscal 2022.

Water Intake

The vast majority of our water intake is seawater used as cooling water at our copper plants. On a non-consolidated basis, the Company's total water intake in fiscal 2023 declined 77% compared with fiscal 2022 to 94.7 million m³ because the cement business was removed as a reporting entity from fiscal 2023. Only 11.4 million m³ (approximately 11%) of the total water intake was fresh water.

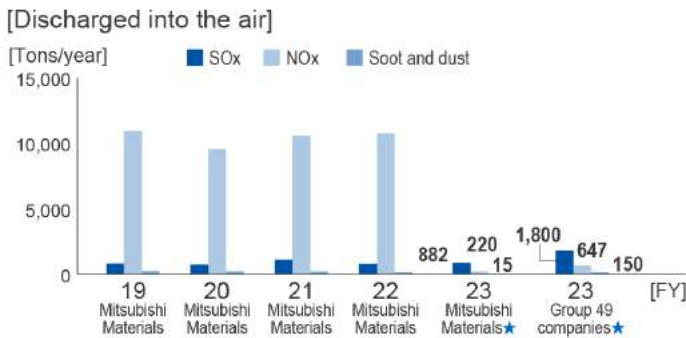


* Excluding fresh water used in hydroelectric power generation
* Excluding seawater used for cooling

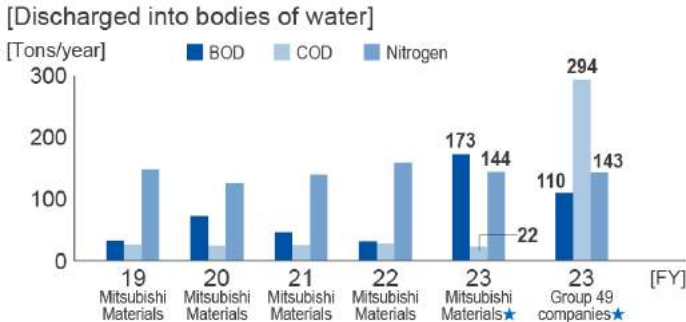
Emissions into the Air and Bodies of Water

We monitor the amounts of sulfur oxides (SOx), nitrogen oxides (NOx) and dust contained in waste gases from facilities, as well as attributes such as BOD (biochemical oxygen demand), COD (chemical oxygen demand) and nitrogen content in wastewater. On a non-consolidated basis, the volume of nitrogen oxides (NOx) emitted into the air by the Company in fiscal 2023 declined 98% to 220 tons, dust declined 89% to 15 tons compared with fiscal 2022 because the cement business was removed as a reporting entity from fiscal 2023.

Emissions into the Air



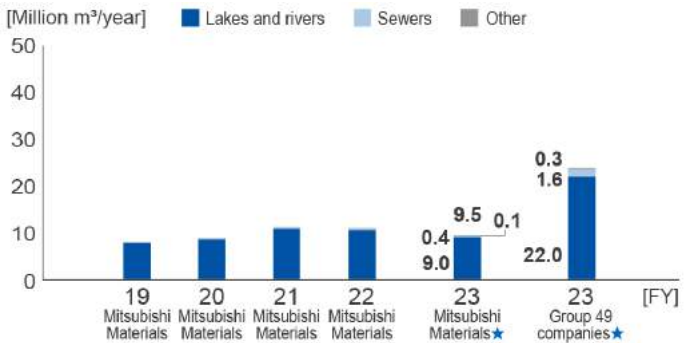
Emissions into Bodies of Water



Water Discharged

On a non-consolidated basis, the volume of water discharged (excluding water drained into the sea) by the Company in fiscal 2023 declined 14% to 9.5 million m³ compared with fiscal 2022 because the cement business was removed as a reporting entity from fiscal 2023. Water drained into the sea by the Company (non-consolidated) was 85.3 million m³, and the vast majority was seawater that had been used as cooling water.

Water Discharged (Excluding Water Drained into the Sea)

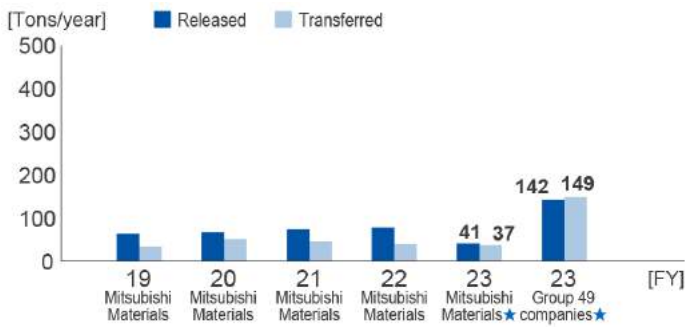


* Excluding water drained into the sea

Chemicals Released or Transferred

The Company’s non-consolidated emissions in fiscal 2023 declined 48% compared with fiscal 2022 to 41 tons due to the cement business being removed as a reporting entity and the cessation of use of a large volume of chemical substances that were being used at one site from fiscal 2023. The transferred amount was 37 tons, a 12% decrease from fiscal 2022.

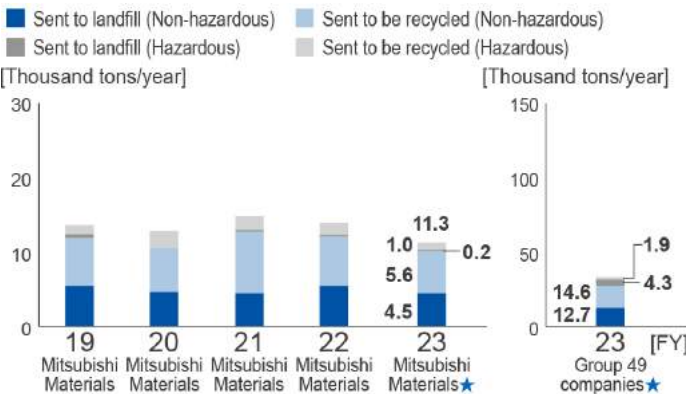
Chemicals Released or Transferred



Volume of Industrial Waste

The volume of industrial waste from the Company (non-consolidated) in fiscal 2023 declined by 19% compared with fiscal 2022 to 11.3 thousand tons because the cement business was removed as a reporting entity from fiscal 2022. The volume of waste sent to landfills by the Company (non-consolidated) in fiscal 2023 was approximately 4.7 thousand tons, which was 18% decreased from fiscal 2022. The total volume of waste for the Group as a whole, including Mitsubishi Materials, came to approximately 45 thousand tons, of which around 50% was recycled.

Volume of Industrial Waste



Preventing Air Pollution

The Group uses manufacturing processes that emit air pollutants such as dust and sulfur oxides (SO_x) as a result of burning fuel, etc. In particular, emissions from our copper smelting and refining plants account for the majority of those emissions. Each site is working to suppress emissions of air pollutants by stabilizing and increasing the efficiency of operations that generate emissions, and by installing advanced waste gas treatment equipment and maintaining appropriate performance.

Preventing Water Pollution

To prevent water pollution, at all of our sites we appropriately treat effluent and impose wastewater management standards that are even stricter than those required by law or municipal ordinance. In addition, to ensure we are ready to deal with leaks of chemical substances or oil spills, we take measures such as installing dikes and inspecting equipment on a daily basis. We also conduct regular training aimed at preventing the spread of substances in the event of a leak.

Chemical Substance Management

The Group's manufacturing plants handle a diverse range of chemical substances. Each site is implementing measures to reduce environmental risks, such as reducing the use of hazardous chemical substances, preventing their leakage into the environment, and reducing emissions. Specific initiatives include the review of processes according to the characteristics of each chemical substance, the installation of new equipment, as well as the switch to less hazardous alternative substances.

Waste Management

To contribute to building a resource-recycling society, we take comprehensive measures to reduce waste discharge and recycle resources from discharged waste. We also engage in recycling operations.

Managing Closed Mines

Purpose of activities	Activities during fiscal 2023	Self-assessment	Targets/plans for activities from fiscal 2024 onwards
<ul style="list-style-type: none"> Managing closed mines 	<ul style="list-style-type: none"> Ongoing training of engineers managing closed mines Upgrading aging facilities (continued) Tailings dam reinforcement work (continued) 	A	<ul style="list-style-type: none"> Ongoing training of engineers managing closed mines Upgrading aging facilities (continued) Tailings dam reinforcement work (continued)

Self-assessment grades A: Target achieved B: Target mostly achieved C: Target not achieved

Managing Closed Mines

We are a company with its origins in the mining industry. The Mitsubishi Materials Group owns a wide range of mines around Japan, including limestone, coal and nonferrous metal mines, such as copper, lead and zinc mines. Operations at all of our non-ferrous metal mines have now been suspended or discontinued. Currently, we are managing 21 closed mines across 15 locations. We have continued to implement the following controls and management programs for our closed mines on a long-term basis, pursuant to Article 5 of our Code of Conduct, which states, "[Environmental Management] We will work to manage our environmental impact and promote decarbonization, make efficient use of natural resources, and accelerate recycling."

- Appropriate treatment of the heavy metal-containing wastewater (acid mine drainage) released from former mining sites
- Management of tailings dams (sites used to store rubble from mining minerals, slag and sediment from mine drainage treatment).
- Inspection and maintenance of excavated mine underground spaces, drifts and channels for conducting mine drainage
- Safety measures to prevent unauthorized entry at disused mine mouths and subsidence sites

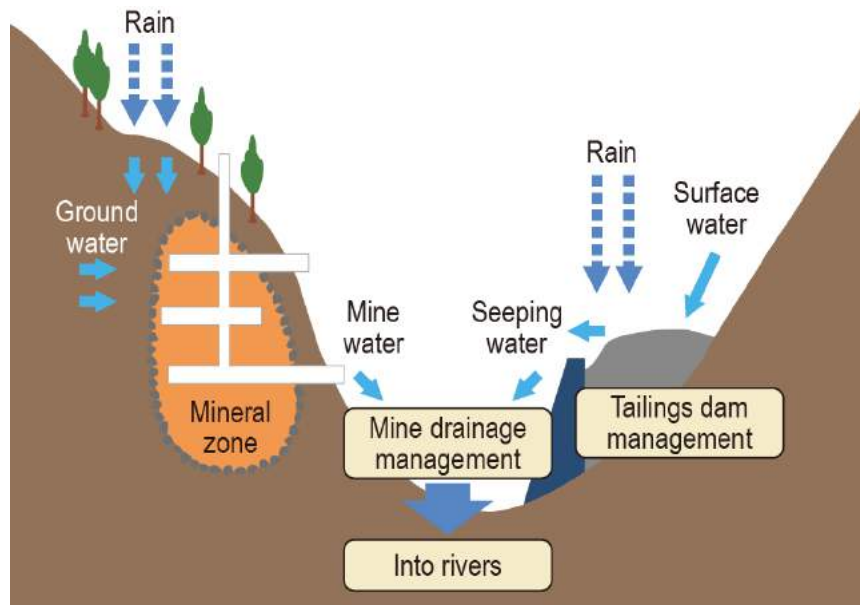
We continue to preserve and maintain sections of mine drift in some closed mines as cultural heritage sites or tourist facilities to exhibit their former conditions and preserve historical mining technologies for future generations.

■ Closed Mitsubishi Materials (non-ferrous) Mines



Overview of Acid Mine Drainage Treatment at Closed Mines

Broadly speaking, acid mine drainage can be generated in two ways. There is the acidic water in the pits (mine water) containing heavy metals, generated through contact between oxidized minerals and rainwater and groundwater, which can fill the underground pits and mining cavities formed in mineralized belts due to mining operations. Then there is the permeated water (wastewater) generated when small amounts of heavy metals, which are contained in slag and other substances in the tailings dams, come into contact with rainwater and surface water. The acid mine drainage goes to processing plants, where it undergoes neutralization and the removal of heavy metals. The water is then discharged into rivers at water quality levels that fall within wastewater standards.



Major Management Tasks for Closed Mines

The Group controls acid mine drainage treatment, tailings dams, mine drifts and entrance drifts. Acid mine drainage treatment involves the appropriate processing. Tailings dam control involves preventing stored slag and sediment from leaking out in case of dam body collapse. Mine drift and entrance drift control involves inspections to maintain waterways for acid mine drainage and sealing entrances to prevent injuries due to third-party trespassing in mine drifts and mine drift collapse. Of these measures, acid mine drainage control is carried out around the clock every day of the year.



Acid mine drainage treatment facilities (Yatani Mine)



Example of tailings dam management (Osarizawa Mine)

Digitalization of Management Tasks for Closed Mines

We are pushing forward with the digitalization of management tasks for closed mines to improve the management and efficiency of the tasks.

- Operational data is collected automatically and centrally managed and utilized as digital data. The use of this digital data enables the remote management of operations at acid mine drainage treatment facilities and other locations.
- We have improved management by creating a system for the early detection of abnormalities, including the visualization of operational data (such as the creation of graphs showing change over time) and remote alarms that are triggered when an abnormality is detected.
- We use smart devices to inspect and maintain records of acid mine drainage treatment facilities and tailings dams, digitizing the inspection results for centralized management. This ensures the efficiency of the tasks by, for example, automatically creating reports.



Visualization of operational data (displaying data trends)



Recording inspection results using smartphone (digitalization of inspection data)

Facility Upgrading and Environmental Countermeasures for Closed Mines

Since 2015, our Group has been implementing responses to deteriorating natural disasters and other risks by conducting protective construction to guard against contamination, as well as reinforcing tailing dams to prevent uncontrolled release of slag and sediment in anticipation of a major earthquake, reducing wastewater at the source, strengthening the capacity of acid mine drainage treatment facilities, and upgrading aging facilities. We recorded an environmental countermeasure reserve for work expenses from fiscal 2016 to fiscal 2019, and in fiscal 2023 we appropriated some additional funds to cover expenses for the repair and toughening of locations damaged due to torrential rains.

Tailings Dam Reinforcement

Drawing on lessons learned from the leakage of slag and sediment at tailings dams managed by other companies during the Great East Japan Earthquake, in November 2012, the Ministry of Economy, Trade, and Industry revised its technical guidelines on aseismic performance. Based on this, we evaluated the stability of the tailings dams managed by the Group, which revealed that measures needed to be implemented at 10 locations. Thus, we started construction work to design and implement stability measures at the locations in fiscal 2016, and have completed these measures at eight of the locations.



Reinforcement work by soil stabilization at the Yatani Mine Tailings Dam (completion)

Wastewater Reduction at the Source

The operational burdens and risks associated with acid mine drainage treatment due to environmental changes (large-scale typhoons and guerrilla rainstorms) in recent years have increased. To ease these burdens and mitigate the risks, we are proceeding with source countermeasure construction, the strengthening of acid mine drainage treatment facility capacity and updating aging equipment. One way of the source countermeasures is to cover exposed surfaces of mineralized belts on a large scale, such as by using the latest technology (which enables greening that was previously difficult due to acidic rock conditions). This prevents rainwater from coming into direct contact with the mineralized belts, which is expected to reduce the amount of water to be processed as well as the burden of contamination.



Contamination containment work (Komagi Mine) (Top: before work, Bottom: after work)



Upgraded pit wastewater treatment facility (Osarizawa Mine)

Human Resources Development

All the Group's non-ferrous metal mines are closed and some time has passed since the mines were closed down. As such, we have seen a decrease in relevant human resources as engineers with skills in non-ferrous metal mine management have either reached advanced age or retired. In order to continue to sustainably manage closed mines, we are continually providing opportunities to train young engineers with little mining experience, and setting up a variety of educational programs for engineers (including programs for acquiring skills for the management of closed mines and for obtaining relevant qualifications), including the use of web training and on-demand instruction. In this way, we strive to transfer mine management skills.



Engineer training (mine tunnel management)



Engineer training (basic training)

Joint Industry-academic Activities

We have opened an endowed laboratory in the field of resources environment and remediation at Hokkaido University, and since fiscal 2018, we have continued to engage in a variety of education and research activities related to the protection of the mine environment. In coordination with the endowed course described above, we engage in a variety of R&D activities to repair and protect mine environments with the help of Hokkaido University as well as other universities and research institutions. We have widely publicized the achievements of these R&D efforts by presenting them in research papers, at symposiums and at other events.

- Greening of former mining sites (University of Tsukuba, Hokkaido University): We are researching the heavy-metal resistance that endophytic fungi can provide to plants in former mining sites, as well as researching and investigating greening by native plants, in our efforts to facilitate the greening of former mining sites, where it has been difficult for plants to take root.
- Examination of a method to evaluate ecological effects (National Institute of Advanced Industrial Science and Technology): We are examining a method of evaluating ecological effects of inflow of mine drainage on rivers from the viewpoint of effects on aquatic organisms by using field surveys.
- Development of a remote monitoring technology (National Institute of Advanced Industrial Science and Technology): We are developing a super power-saving remote monitoring system with radio wave directivity, a technology that will enable the collection of management data from remote locations in mining areas without a power grid or communications network.
- Other (Hokkaido University): To improve issues with the operation and management of acid mine drainage treatment, we have begun a new study to evaluate the risks of the leaching of heavy metals from neutralizing precipitate and understand the sedimentation mechanisms of manganese oxides under low concentration conditions.



A plant tour given to students from an endowed laboratory (site tour)



A greening survey at a former mining site



A river ecological survey (collection of benthos)

Communication with Local Residents

To promote local residents' knowledge of our measures for preventing mining-induced pollution at our closed mines, we proactively hold sessions to explain countermeasure work and offer facility tours. We also strive to take part in environmental conservation activities and contribute to local communities through tree-planting and the release of juvenile fish, as well as participation in and cosponsoring of local events and festivals. In addition, we accept inspection tours of our mining facilities by students and researchers from Japan and overseas. We thus offer our facilities as locations for research and development and skills training related to the prevention of mining-induced pollution.

The vast majority (approx. 88%) of the water we consume at the Mitsubishi Materials Group is seawater used as cooling water. Consumption of fresh water (such as industrial water and groundwater) is comparatively low. However, because a shortage of fresh water may affect our business activities, securing the necessary quality and amount of water is essential for the business operation of the Group. One of the Group's environmental policies is "Effectively Use and Conserve Water Resources," and we are working to reduce the amount of water we use through its reuse, recycling and other efforts across every aspect of our business activities, including cooling water and cleaning water.

In addition, we have considered the seriousness of the water-related problems that have occurred frequently in recent years, such as typhoons and flooding, and the great impact of these problems. We manage the risks related to these problems accordingly. We implement measures for reducing water risks at individual facilities. To reduce our use of freshwater resources, we take action such as the effective use of seawater, water conservation through more efficient production processes, water recycling, and the thorough purification of wastewater. To secure water resources, we save water through measures including the recycling of water, the introduction of equipment with low water consumption, and the renovation of equipment to reduce water consumption. As measures against flooding, we take initiatives including the elevation of buildings, pumps, and electric equipment, the installation of drainage pumps, as well as the implementation of disaster drills assuming high water events. We also take measures to prevent abnormalities in the quality of the effluent from our facilities and to prevent water quality accidents. These measures include the management of effluent under our own standards that are stricter than laws and regulations, as well as the introduction of sensors that detect abnormal water quality and a system that stops water discharges automatically.

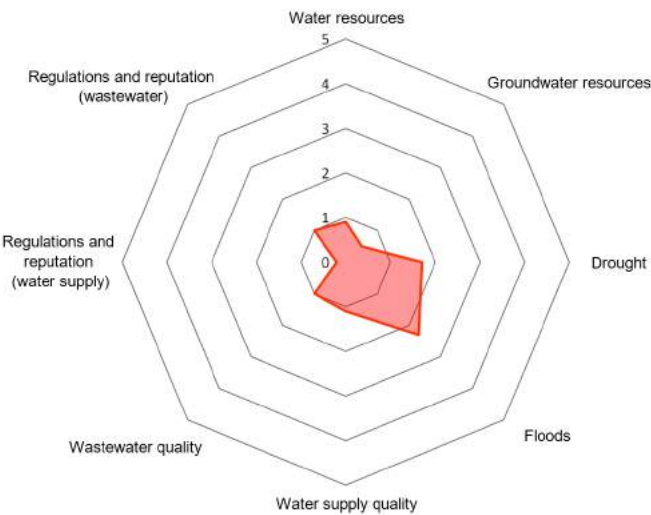
■ State of Water Risk Assessment Initiatives

To ascertain the state of water risks at the Group's manufacturing facilities (some of which include research institutes), we are utilizing the Aqueduct water risk assessment tool developed by the World Resources Institute (WRI) to conduct individual risk assessments for each facility, covering various water risks including those relating to securing water resources and those of incurring flood damage.

There were eight Group company locations rated as having high water stress, but sales related to these locations accounted for 7% of Group company sales. In fiscal 2023, water withdrawal was 99,585 thousand m³ and water consumption was 1,363 thousand m³. Additionally, in order to ensure that water risk assessments are in line with actual conditions at these facilities, we supplement the results of water risk assessments performed using Aqueduct by taking into account information including the history of any past water risks that have materialized at each facility (history of occurrences of flood, drought, and water supply quality deterioration, etc.) and water usage associated with business activities (amount of fresh water and groundwater used, emissions of pollutants contained in wastewater).

The results of these supplemented water risk assessments are used to produce visual representations of water risks for each facility, using radar charts displaying risk scores for each assessment item, and shared with each business location. Each business site registers items assessed as high risk as risk factors unique to that facility, and engages in risk management by formulating and implementing measures including the reduction of water risks.

Example Radar Chart Showing Water Risks for Each Facility



"Water quality risks" are assessed separately for both water supply and wastewater, from the viewpoints of impact on operations due to the deterioration of water supply quality and impact on the environment due to wastewater at business sites. "Regulatory and reputation risks" are also assessed for both water supply and wastewater, from the perspectives of toughness water supply and wastewater regulations and the reputation of the region.

Preserving the Natural Environment

Theme of activities	Results of activities during fiscal 2023	Self-assessment	Targets/plans for activities from fiscal 2024 onward
<ul style="list-style-type: none"> Contributing to local communities, society, and the global environment through sustainable management of company-owned forests 	<ul style="list-style-type: none"> We received and passed periodic screenings to maintain forest certification from the Sustainable Green Ecosystem Council (SGEC). (Site inspections were conducted at Teine Forest and Bibai Forest.) 	A	<ul style="list-style-type: none"> Maintain SGEC forest certification
	<ul style="list-style-type: none"> We maintained forests appropriately based on our forest management plan, including cutting and thinning (133.56 ha), planting (11.19 ha) and weeding / clearing away underbrush (59.26 ha). 	A	<ul style="list-style-type: none"> Promote environmental conservation of forests by maintaining forests appropriately based on our forest management plan
	<ul style="list-style-type: none"> We tried to develop forests by making use of nature's strengths, aiming for both environmental and economic achievements. 	A	<ul style="list-style-type: none"> Pursue beautiful forests that are resistant to disasters and have high public interest functionality, through various effective forest development practices
	<ul style="list-style-type: none"> We performed tree thinning with small-scale work channels at Teine Forest and Ikuno Forest, as a method for implementing disaster-resistant forest development. 	A	
	<ul style="list-style-type: none"> The environmental impact of thinning is small, and a beautiful finish has been achieved through the application of horse logging (a method of timber gathering that makes use of horses). (Hayakita Forest) 	A	
	<ul style="list-style-type: none"> We enhanced monitoring activities such as the introduction of a smartphone app to more accurately assess the state of the conservation of biodiversity, changes in ecosystem services (public functions) that occurred through forest maintenance, and the amount of forest growth, etc. 	A	<ul style="list-style-type: none"> Consistently implement monitoring activities and establish quantitative evaluation methods for evaluations ecosystem services (public function) in collaboration with research institutions
	<ul style="list-style-type: none"> We have conducted measurement tests of the amount of forest resources using remote sensing technologies including drones and satellite data, and achieved a certain level of precision. 	A	<ul style="list-style-type: none"> Efficiently ascertain and organize forest data utilizing remote sensing, ICT and IoT technologies
	<ul style="list-style-type: none"> We donated Christmas trees made with trees from company-owned forests and tree graduation certificates made using wood from company-owned forests to preschools in company-owned forest areas and held tree planting events for them. 	A	<ul style="list-style-type: none"> Continue to contribute to local communities through services related to company-owned forests (initiatives such as the donation of Christmas trees)

<ul style="list-style-type: none"> • We provided wood as a building material for elementary and junior high schools in Abira Town, Hokkaido, where our company-owned forest is located, as an initiative to effectively use the wood from company-owned forests. 	A	<ul style="list-style-type: none"> • Increase the value of company-owned forest by promoting utilization of high added-value wood from company-owned forests and contribute to economically sustainable forest management
<ul style="list-style-type: none"> • We make company-owned forests available as sites for the nature experience activities of local NPO organizations, training for the purpose of popularizing the forestry industry, research / surveys by universities and other research institutions, and sports competitions, etc. 	A	<ul style="list-style-type: none"> • Promote the provision of company-owned forests as sites for recreational activities, education, research, and training

Self-assessment grades A: Target achieved B: Target mostly achieved C: Target not achieved

Preserving Biodiversity

The preservation of biodiversity is an element that forms the basis of our approach to business. We clarify this point both internally and externally by stating, “We will be more considerate of biodiversity and work to live in the harmony with nature”, in the Article 5 of our Code of Conduct. In addition, in our Environmental Policy we state, “We engage in business activities that take ecosystems into account throughout our value chain, including the development of natural resources.”

In our business activities, the impact on biodiversity is particularly notable at the overseas mines from which we procure raw materials. At the copper mines in which we have invested and are our important suppliers (Copper Mountain Mine in Canada, Escondida Mine in Chile, Los Pelambres Mine in Chile and Mantovelde in Chile), an Environmental Impact Assessment was appropriately conducted before the mining operations commenced and environmental monitoring has continued ever since. In ongoing copper mine development projects (at Zafranal in Peru and Namosi in Fiji), we are carrying out environmental baseline studies for Environmental Impact Assessment and collecting data for preserving diversity.

Copper Mountain is committed to biodiversity conservation management and reclamation, focusing on minimal disturbance and increasing areas that can be reclaimed prior to site closure. More specifically, Copper Mountain has developed strategies for achieving end land use and reclamation objectives, including improving physical stability, water quality and water-course protection, sediment retention and erosion control, soil salvage and storage, suitable revegetation, and the eradication of invasive species. These strategies, along with our plan to manage biodiversity conservation for vegetation, wildlife, water, and aquatic components, and a detailed monitoring plan for reclamation, are outlined in Copper Mountain’s Biodiversity Conservation Management Plan.

As an investor, we confirm in advance with operators of the mines that these initiatives will be taken, and encourage them to take such initiatives. In addition, when we procure materials from a mine in which we do not invest, we confirm that considerations are given to natural protected areas and biodiversity is preserved, in accordance with the CSR Procurement Standards of Metals Company.

We also take initiatives to preserve biodiversity at our manufacturing facilities by considering the characteristics of each site. For example, at Naoshima Smelter & Refinery (Naoshima Town, Kagawa County, Kagawa), we have been engaged in tree-planting activities at a rate of one hectare per year with the aim of promoting vegetation and restoring forests which were partially destroyed by forest fires in the past and where it is difficult for plant life to grow due to the dry soil conditions and low rainfall. Naoshima Smelter & Refinery also ensures thorough treatment of exhaust gas and effluent released from the facility under its own standards, which are stricter than government standards, in its efforts to protect the natural environment of Setouchi.

We own 14,000 hectares of forest across Japan and manage it by considering the habitats of the plants and animals that live there. We carry out wildlife monitoring and include rare species confirmed to be living in the areas on our red list. Our nine forests in Hokkaido have obtained certifications for sustainable forest management with consideration for biodiversity. We will continue to consider the contact points between our business activities and biodiversity, and take action to conserve biodiversity from a broad perspective.

TOPICS

Participation in the 30by30 Alliance for Biodiversity

- We Will Make Use of Our Company-Owned Forests to Contribute to Conservation of Biodiversity -

Mitsubishi Materials Corporation has been enrolled as a participating company in the 30by30 Alliance for Biodiversity ("Alliance") at the initiative of the Ministry of the Environment as of April 2022.

This Alliance is a coalition of the willing established for the achievement of the nature-positive global goal to halt and reverse biodiversity loss by 2030.

To accomplish this goal, Japan, with the aim of achieving the conservation and protection of at least 30% of the country's lands and waters by 2030 (30by30), has committed not only to expanding protected areas such as national parks, but also to designating as OECMs (other effective area-based conservation measures) areas other than protected areas, such as company forests, conducive to the conservation of biodiversity.

We aim to register the forests we own as "natural symbiosis sites" as part of an initiative led by the Ministry of the Environment to obtain "Other Effective area-based Conservation Measures" (OECM) certification.



- ▶ Participation in the 30by30 Alliance for Biodiversity
- ▶ Cooperation in project demonstrating the certification of Natural Symbiosis Sites (tentative name)

Biodiversity Initiatives at Our Mine

■ Monitoring Water Quality at Copper Mines (Copper Mountain Mine)

We invest in Copper Mountain Mine, located in British Columbia, Canada, where we engage in corporate management with an emphasis on biodiversity.

Copper Mountain Mine (CMM) begin our mine planning process with a comprehensive progressive reclamation plan to safely transition from mining operations to closure. This plan includes planning for closure, allocating appropriate resources for reclamation, and involving stakeholders, including local First Nations, at the earliest stages of operations. At the CMM, they are working with First Nations to clarify end land use objectives, and to understand and disseminate information about the baseline conditions related to the social, economic, environmental, and cultural aspects of our operations and the desired recreational and traditional end land uses for the mine site.

CMM's progressive reclamation begins at the mine planning stage and is continuously executed as a part of mine operations. This progressive reclamation process started at CMM in 2018. The 2018 reclamation areas were small-scale initial trials. This progressive reclamation program is based on 25 hectares of reclamation per year over the next 10 years.

In 2022, CMM completed reclamation monitoring on all the reclaimed areas around the site. This included documenting observations of the existing vegetation species and their overall health. CMM also tested the soils and vegetation for various nutrients to ensure a thorough understanding of the soil condition and plant health. In 2023, CMM plan to commence planting shrubs and trees on the Non-Economic Rock Storage Areas (NERSA) in the areas previously identified for reclamation.

Results of Reclamation Monitoring at Copper Mountain Mine are shown below.

CMM PROGRESSIVE RECLAMATION	
Year	Progressive Reclamation activity (ha)
2022	20.31
2021	23.97
2020	20.99
2019	7.47

In 2022, the following trees and shrubs were planted in the Wolfe Creek Realignment Area, a small creek neighboring the mine.

- 976 trees planted
- 7,500 shrubs planted
- 2,500 willow and dogwood stakes planted

In addition, we continually monitor the quality of water in local rivers, in accordance with quality guidelines issued by the provincial government, and also carry out ongoing biodiversity surveys of the surrounding area in order to gauge the impact of our activities on the ecosystem, including birds, mammals, amphibians, aquatic organisms and their habitats.

In 2019 we launched the Fish Habitat Offsetting Plan (FHOP) to offset a portion of the aforementioned Wolfe Creek, and have continually engaged in environmental monitoring thereafter. The habitat for organisms in the offset stream was recognized as a good fish spawning and rearing environment for rainbow trout and other species, and in 2022 the Copper Mountain Mining Corporation received an award in the Metal Mine category from the British Columbia Technical and Research Committee on Reclamation in recognition of this achievement.



The FHOP site



A rainbow trout

■ Environmental Impact Assessment as part of Copper and Gold Deposit Development Project

We are carrying out a basic environmental study geared towards conducting EIA* as part of a development project in Zafranal, in southern Peru. At the same time, we are studying and analyzing ways to minimize the potential impact on the environment by the development, and are looking into measures to secure new habitats for species of flora and fauna if there is a risk of any impact on the ecosystem.

* Environmental Impact Assessment



Exploration drilling



River water quality survey

Environmental Impact Assessment on Construction of Power Plants

■ Environmental Impact Assessment for Launch of Operations of Appi Geothermal Plant

In 2015, we established Appi Geothermal Energy Corporation in conjunction with Mitsubishi Gas Chemical Company, Inc. to the west of Appi Highlands in Hachimantai City, Iwate. We were joined by Electric Power Development Co., Ltd. in 2018, and the three companies are promoting the project towards the launch of the operation. The project aims to begin operating a 14,900 kW geothermal power plant in 2024. Appi Geothermal Energy Corporation began procedures for an Environmental Impact Assessment in 2015, and studied, predicted, and assessed the impact of the construction of the Appi Geothermal Power Plant on the surrounding environment. The company received approval for the final environmental impact statement from the Minister of Economy, Trade and Industry in January 2018 and began construction of the plant in August 2019.

■ Voluntary Assessment of the New Komatagawa Hydroelectric Power Plant

We own a hydroelectric power plant immediately below the Moriyoshi Dam in the Komata River, a branch stream of the Ani River in the reservoirs along the Yoneshiro River in Kita-Akita City, Akita. In May 2019, we began construction on the New Komatagawa Hydroelectric Power Plant (rated output: 10,326 kW), a hydroelectric power plant that will use the discharged water which was used for power generation at the existing plant. When planning the construction of the new power plant, we undertook a voluntary environmental assessment to determine the impact on the surrounding environment. We are also creating a new plan to ensure that the flow rate of surplus from the new plant will be appropriate for the river to preserve the surrounding river environment. In addition, we will carry out eco-friendly construction work. We will use power supplied from the existing hydroelectric power plant, a renewable energy, for construction work on the headrace tunnel with TMB method. We will also engage in environmental initiatives including the recycling trees that were felled to construct the new power plant.

Biodiversity Conservation Activities of PT Smelting (Indonesia)

■ Activities for Protecting Rare Animals

To further develop its activities for environmental protection and biodiversity preservation, PT Smelting has been co-sponsoring a program for protecting rare animals by Taman Safari Indonesia since 2018.

In this program, endangered species designated by the International Union for Conservation of Nature (IUCN) are bred and released into the wild to ensure their sustainability. PT Smelting participates in a program to protect Javan hawk-eagles. The Javan hawk-eagle is the national bird of Indonesia because it has the same characteristics as Garuda, the divine bird in the national emblem of Indonesia (Garuda Pancasila). However, recently there is concern over the decrease in the population of this species due to the destruction of rainforests as well as poaching. Through this program, the company not only aims to breed Javan hawk-eagles as a national symbol but also to support the education of children as future leaders and biological research on the birds, thereby contributing to preserving biodiversity.



Javan hawk-eagle
Photo provided by Taman Safari
Indonesia

Basic Approach to Sustainable Forest Management

We currently own around 14,000ha of forestland in Japan, mainly in Hokkaido, making us one of the largest owners of forestland in the country. We previously began acquiring forests for the purpose of supplying wooden supports for our own mines and coal mining activities. However, due to the closure of our domestic mines and coal mining in general, our forests now fulfill different roles and are subject to different expectations.

We are managing the forests for the purpose of harnessing their ecosystem services in a high level. Those services include not only the production of lumber as a renewable resource but also the provision of public recreational spaces, the prevention of global warming through CO₂ fixation, and the conservation of biodiversity.

Each of the company-owned forests vary by area in terms of location and environmental conditions, as do the functions they are hoped to fulfill. As such, we have adopted four categories (zoning) by which to divide the forests we manage: water and ecosystem conservation zones, health and cultural usage zones, selective natural forest cutting zones, and timber resource recycling zones. We specify what functions need to be improved and what management methods apply for each zone type. While thoroughly implementing this kind of meticulous forest management, we are pursuing beautiful forests that are rich in function, based on the slogan: "A "beautiful forest" that is needed by society by making the most of natural resources and maximizing their functions and utilization."

By way of outside recognition for sustainable forest management initiatives such as these, on October 1, 2012, we obtained certification from the Sustainable Green Ecosystem Council (SGEC) at Hayakita Forest in Hokkaido. Since then, the SGEC has implemented certification standards outlining transitional procedures for mutual certification with the Programme for the Endorsement of Forest Certification (PEFC), an international forest certification scheme. With that in mind, we simultaneously obtained forest certification under the SGEC's new standards for a total of nine forests in Hokkaido on September 1, 2015, including Hayakita Forest.

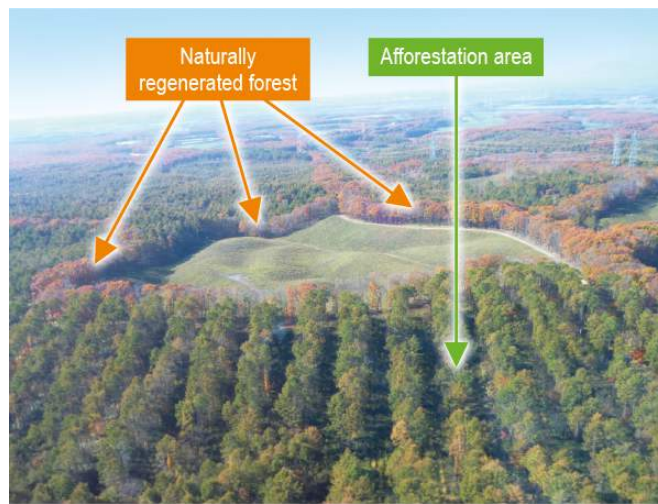


■ The Zoning of Company Forests and Management Policies

Zone	Activity
Water and ecosystem conservation zones	Maintain the natural forest by the water and convert it into a natural forest if artificial
Health and cultural usage zones	Create a model forest and facilities for walking and other forms of forest recreation
Selective natural forest cutting zones	Produce useful broad-leaved trees in a sustainable manner by felling trees in naturally regenerated forests within a range not exceeding their growth
Timber resource recycling zones	Actively encourage tree-planting and thinning in the artificial forest cycle to contribute to decarbonization

■ Data on Company-owned Forests

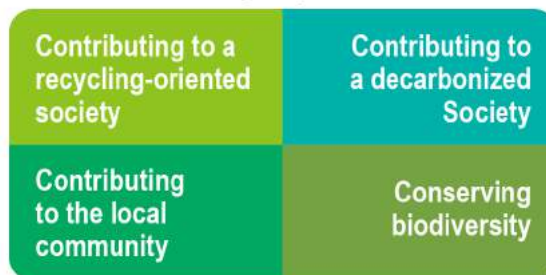
31 locations nationwide	
Total area	Approx. 14,000ha
SGEC certified area	11,431ha * 9 forests in Hokkaido
Natural forest	Approx. 7,000ha
Artificial forest	Approx. 7,000ha



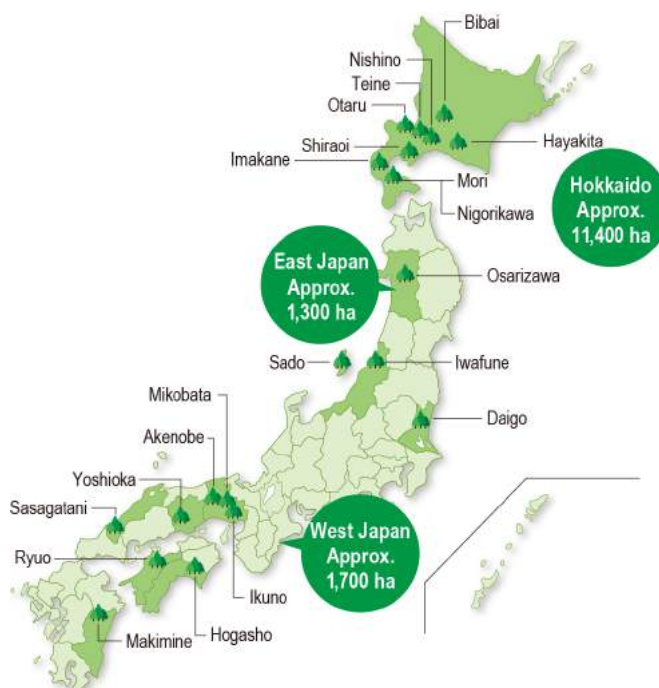
Hayakita Forest

The forest is laid out in a mosaic pattern, based on appropriate zoning between naturally regenerated forest (a forest made up of trees that have grown naturally), which has been conserved as a water and ecosystem conservation zone, and afforestation areas (trees grown from seedlings planted manually), planted with Japanese larch to be used as recycled resources for efficient lumber production.

The Value of Company-Owned Forests



Distribution and Scale of Company-owned Forests



1. Contributing to a Recycling-Oriented Society

–Supplying Society with Sustainable Timber Resources–

Timber is an outstanding sustainable resource. We produce approximately 10,000 m³ of timber every year, mainly in timber resource recycling zones and selective natural forest cutting zones, and supply the timber to society as raw materials and fuels for a variety of products, from building materials to woody biomass fuels. We thus contribute to building a recycling-oriented society. To enable a sustainable lumber supply, we appropriately maintain and regenerate forest resources by following the management policy formulated for each zone. In timber resource recycling zones where we manage artificial forests, we maintain the cycle of thinning and planting trees, thereby ensuring a sustainable, stable supply of lumber from needle-leaved trees such as cedar and Japanese larch. In addition, in selective natural forest cutting zones, we keep forests vital and sound by promoting thinning and selective cutting (thinning selected trees) within a range not exceeding their growth, as well as appropriate natural regeneration (sprouting young trees from seeds which fall to the ground naturally). Thus, we aim to achieve sustainable supply of timber from broad-leaf trees. In natural forests, a wider variety of tree species coexist than in artificial forests. Accordingly, appropriate and extensive knowledge and skills corresponding to a wide variety of species are necessary when managing natural forests. We therefore strive to improve our knowledge and skills related to natural forests through initiatives such as inviting a Swiss forester with a wealth of knowledge on the management of natural forests to teach.

In Japan, many natural forests were replaced with artificial forests in the post-war period. Therefore, the depletion of forest resources, particularly the depletion of broad-leaf trees growing in natural forests, has been a chronic problem. Accordingly, the furniture industry has been forced to increasingly rely on imported timber, which constitutes the majority of the raw materials they use, because many of their products are made of timber from broad-leaf trees. We are attempting to convert parts of artificial forests into natural ones in our efforts to restore broad-leaf tree resources. In addition, to promote the cyclical use of timber from broad-leaf trees produced in Japan, we have chosen our own offices as the places to begin. We utilized timber from broad-leaf trees produced in our company-owned forests for the tables in the company cafeteria of the Head Office, as well as the office furniture, etc. including meeting tables and chairs for Sapporo Office, where the forest management division is located.



Supplying timber from forest thinning to society



Forest management training taught by foresters from Switzerland

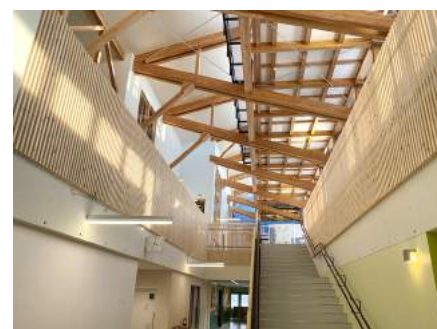


A big table at the corporate cafeteria of the Head Office

TOPICS

School Utilizing Timber from Company-owned Forests Opens in Hokkaido

Raw Japanese larch logs that were cut down for maintenance of the Hayakita Forest, which is owned by Mitsubishi Materials Corporation, were used for the beams, columns and other members of the new school building of an integrated elementary and junior high school for compulsory education in a town opened in April 2023, where our company-owned forest is located.



School building using timber from our company-owned forest

2. Contributing to the Local Community

—Forests Where Local People can Relax and Interact with the Wonders of Nature—

As well as being company assets, our company-owned forests are an important element of the environment, in terms of shaping the local area. We contribute to local communities through appropriate forest management, which improves the quality of ecosystem services, including watershed protection, prevention of soil loss and recreation. Company-owned forests located on the outskirts of urban areas meanwhile are positioned as “environmental forests,” parts of which are open to the general public to enjoy the natural environment up close. Located in the Teine area of Sapporo, Teine Forest is blessed with a slice of rich forestland that also has excellent transport access from the city center. We open up part of the forest to the people of Sapporo as a public forest, for purposes such as nature walks and camping ground. We also provide access to fields for nature activities organized by a local NPO, as a practice slope for local elementary school children to improve their skiing, and for research by universities and other institutions. That is why it is important to maintain an environment that is suitable for each of these purposes, so that everyone in the local community is able to use our company-owned forests in a meaningful way. In addition, we are proactive in activities such as thinning trees to add light to the interior of our forests, removing dangerous trees, and creating and maintaining paths in the forests. Instead of just offering our company-owned forests for use by local residents, we implement initiatives such as tree planting festivals, tree growing festivals, and other environmental events in our forests to teach local people about the value and fun that forests provide, including their biodiversity. We also actively pursue support activities in areas that were affected by natural disasters in the past. We worked on the recovery of a forest owned by Mori Town, Hokkaido, which was damaged by the typhoon in 2016. We also donated Christmas trees from our company-owned forests to local nurseries in Atsuma Town, which were affected by the Hokkaido Eastern Iburi earthquake in 2018, and continue to pursue activities including the donation of wooden graduation certificates made using the wood waste of broad-leaf trees generated in forest maintenance to preschools that use Materials Forest as a place for contact with nature.

We continue to contribute to local communities through these kinds of active initiatives and increase our efforts to make the forests of Mitsubishi Materials into valuable features of their local areas.



An environmental event making tree name plates in a company-owned forest



A Christmas tree sent to a nursery in Atsuma Town, which was affected by the Hokkaido Eastern Iburi earthquake

TOPICS

Providing Company-owned Forests as a Place for Local Elementary School Students to Experience and Learn about Forestry

As part of our educational program for elementary schools in towns where our company-owned forests are located, we have offered our “Materials' Forests” for hands-on experience. By allowing students to observe and experience activities such as tree planting and forest thinning work, the program deepens ties between the Company and the local community.



Observing tree thinning work

3. Contributing to a Decarbonized Society

–CO₂ Fixation–

One of the important ecosystem services of forests is CO₂ fixation. As one of the largest owners of forestland in Japan, we dedicate ourselves to the steady promotion of appropriate forest maintenance, and do our level best to enhance the CO₂ fixation capabilities of the trees in our forests, so that we can do our best to prevent global warming. The current CO₂ fixation capabilities of our forests are estimated* to be 53,000 tons of CO₂ per year (equivalent to the annual amount of CO₂ emitted by approximately 27,000 people).

The ability of trees to fix CO₂ peaks during the period when they are young or middle-aged, and gradually declines thereafter. That is why we make every effort to regenerate our forests, by felling and planting new trees at the right time, or through natural regeneration, in order to maintain CO₂ fixation capabilities over the long term.

We also strive to fix CO₂ in forests by promoting the active use of usable timber from forest thinning, which is a forest maintenance measure, instead of leaving this timber in forests. We place priority on the production of high-quality, large-diameter timber to be used over long time frames, as building materials or for furniture for instance. This is another of our initiatives for effective CO₂ fixation.

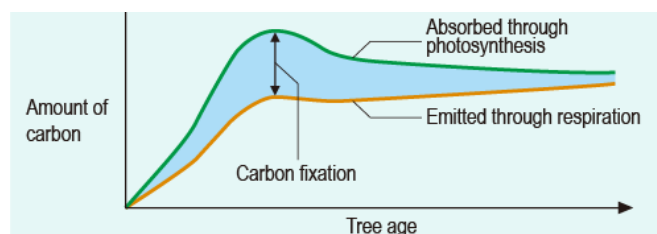
* Method of calculation

$\text{Growth (m}^3\text{)} \times \text{material volume weight (t/m}^3\text{)} \times \text{carbon conversion efficiency} \times \text{tree/trunk ratio}$
 $\times \text{CO}_2 \text{ molecular weight} / \text{carbon molecular weight}$



Japanese larch

Relationship between Tree Age and Carbon Absorption/Emissions



* Partially processed and quoted from the Japan Forestry and Forest Products Research Institute materials.

4. Conserving Biodiversity

–Maintaining an Environment Suitable for a Wider Range of Wildlife–

Our company-owned forests are extremely important as a habitat for a diverse range of wildlife. We therefore take the utmost care to ensure that our various activities, including timber production, do not have a detrimental impact on living organisms.

In particular, forest ridge and riverside areas are migration pathways for creatures. They are called green corridors because those forests are extremely important for expanding the habitat of wild animals and allowing their interactions. We therefore prohibit clearcutting these forests, in principle. We also refrain from clearcutting large areas of land even in artificial forests, where we proactively produce timber, because it may reduce biodiversity in those forests. Instead, we clearcut small, dispersed areas. In addition, we are planning not to clearcut artificial forests which are judged difficult to manage efficiently. We aim to nurture these forests into natural forests with richer biodiversity. We have also introduced trial forest maintenance methods in selected areas, aimed at conserving biodiversity. These include multi-layered forest management that prevents creating completely bare areas following felling operations, and pursuing mixed forest management between coniferous and broad leaf trees in certain areas, in order to leave naturally invasive broad-leaf trees in areas in which coniferous trees are the main user of resources, thus giving the forest a more diverse structure. By developing various types of forests in this way, we are striving to increase the diversity of the overall forest environment, thereby contributing to conserving biodiversity.

We also proactively monitor wildlife. As well as recording wildlife sightings during regular patrol activities, we have positioned a large number of wildlife survey sites in our forests, where we regularly inspect the wildlife living there and confirm the positive or negative impact of our forest maintenance. In particular, when we do forest maintenance involving felling, we separately carry out monitoring surveys before and after, to confirm that wildlife has not been affected. If any rare species are found in an area in a monitoring survey before felling, we change the time or method to one that will not affect those species, or consider the postponement of the planned maintenance.

Rare species that have been confirmed to be living in the area (most endangered species included on red lists published by the Ministry of the Environment and Hokkaido Government) are included in our own red list of rare species living in Mitsubishi Materials company-owned forests. We issue warnings to all involved parties with access to the relevant forests to conserve biodiversity, such as by holding regular training sessions for them.



Daily monitoring activities



Wildlife camera trap



Japanese sable



Black woodpecker



Masu salmon



Japanese primrose



Dogtooth violet

- ▶ Participation in the 30by30 Alliance for Biodiversity
- ▶ Cooperation with a Demonstration Project for Certifying "Natural Symbiosis Sites (Tentative Name)"

Biodiversity policy in Company-owned forests

1. In carrying out operations, in accordance with the separately specified 'Guidelines for operations in consideration of the conservation of biodiversity', consideration shall be given to maintaining a healthy forest with a good balance of diverse vegetation and diverse stages of growth and to conserving the environment in which valuable plants and animals grow, in order to maintain and conserve biodiversity.
2. Identify species of valuable natural vegetation and animals with high potential for growth and habitat, distribute a 'List of valuable natural vegetation and animals' to staff and contractors (workers), and have them carry it with them when they visit the site for monitoring.
3. Promote activities that contribute to the conservation of biodiversity, such as the certification of nature symbiosis sites, in order to contribute to Nature Positive and the 30by30 target.
4. Organize on-site training sessions by experts to improve the knowledge of staff.

(Excerpt from a company forest management and administration plan)