



**Effective Use of Non-Ferrous Metal Resources**

**Environmental Management**

**Climate Change**

**Significant Environmental Accidents / Biodiversity**

**Environmental Data**

# Environment

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# Effective Use of Non-Ferrous Metal Resources

## Vision for 2030

### A company that generates resources through high technological capabilities

1. A company that stably provides non-ferrous metals to society
2. A company that contributes to society by effectively using impurities through collaborative, open technological development among industry, academia, and government
3. A company that contributes to the construction and maintenance of recycling systems for non-ferrous metals
4. A company that develops and supplies highly advanced materials that contribute to the resolution of social issues

#### Approach and Policy

GRI 3-3

Non-ferrous metal resources see wide use in fields connected to the resolution of social issues such as climate change. By making effective use of finite non-ferrous metal resources without waste, we believe that we can contribute to achieving a sustainable society. Our Group uses our production capabilities as a foundation for carrying out research and development that includes collaboration with external parties, and works to enhance our technological capabilities related to product creation. We strive to stably supply non-ferrous metal resources, create value from unused resources, and utilize technologies for recovering and recycling hard-to-process resources.

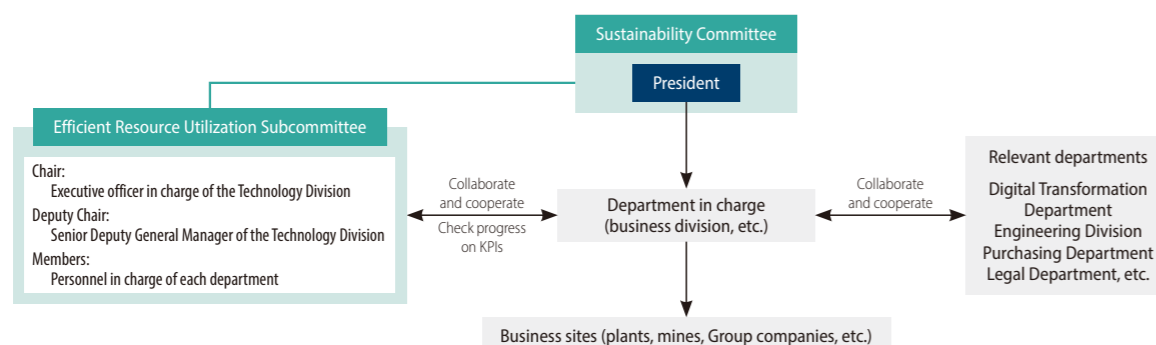
#### Promotion Structure

GRI 3-3

As activities concerning the effective use of non-ferrous metal resources, one of our material issues, involve numerous KPIs and specific measures that must be made consistent with business strategy, the activities are led by business divisions. The business divisions collaborate and cooperate with the Efficient Resource Utilization Subcommittee and relevant departments to engage in activities aimed at achieving our KPIs and Vision for 2030.

The Efficient Resource Utilization Subcommittee, which has the Technology Division as its secretariat, performs progress management and support for the activities of the business units. Because the Technology Division plays a particularly large role in providing support for technical aspects, our support structure integrates this division with the subcommittee.

#### Promotion Structure



## Medium-Term Targets and Progress

GRI 3-3

To achieve our Vision for 2030, we are managing progress for each KPI and have made achievement criteria and action plans for up to 2030.

FY2022 Results	FY2023 Plan	Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 1. 1) Advance copper mine projects</b> <ul style="list-style-type: none"> <li>Strengthen production structure at JV mines to achieve and maintain copper production level of 300 kt/year from interests</li> <li>Achieve steady copper production level by reinforcing exploration of surrounding and deep areas in JV mines, expanding mineral processing technology, and improving operations leveraging IoT and AI</li> <li>Advance Phase 2 and later projects at the Quebrada Blanca Copper Mine</li> </ul>			
<ul style="list-style-type: none"> <li>Copper attributable production at JV mines in 2022 was 200 kt, falling short of the forecast of 220 kt (announced in May 2022)</li> <li>Reasons for this included a shortage of truck staff at the Morenci Copper Mine, effects of the COVID-19 pandemic at the Cerro Verde Copper Mine, truck maintenance delays and sinkhole accidents at the Candelaria Copper Mine and Ojos del Salado Copper Mine, and decline in grade of the main ore body at Northparkes Copper Mine</li> <li>Focused on the start of copper concentrate production from Phase 2 at the Quebrada Blanca Copper Mine</li> </ul>	<ul style="list-style-type: none"> <li>Copper attributable production at JV mines in 2023 is predicted to be 210 kt</li> <li>At all mines, undertake measures to overcome the challenges of 2022 and urge steady implementation of these measures through participation in the Management Committee and technical meetings</li> <li>Begin copper concentrate production from Phase 2 at the Quebrada Blanca Copper Mine, and study subsequent projects</li> </ul>	<ul style="list-style-type: none"> <li>Achieve copper production level on an interest basis of 270 kt by starting production in Quebrada Blanca Phase 2, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Aim to obtain further interests to achieve copper production level on an interest basis of 300 kt, which is the long-term vision</li> </ul>
<b>KPI 1. 2) Acquire new superior copper and gold resources</b> <ul style="list-style-type: none"> <li>Develop new mines for which we have operatorship</li> </ul>			
<ul style="list-style-type: none"> <li>Through channels including Kenorland Minerals Ltd., in which we invested in 2021, conducted studies aimed at entry into new JV exploration projects, acquisition of new mines, etc.</li> <li>Also engaged in onsite surveys, information gathering necessary for the formation of new JV exploration projects, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Through entry into new JV exploration projects, information gathering aimed at acquisition of new mines, onsite surveys, etc., plan to continue conducting studies aimed at obtaining new operatorship</li> </ul>	<ul style="list-style-type: none"> <li>Participate in new exploration projects through joint ventures and prepare for acquisition of new mines, etc., to obtain new operatorship</li> </ul>	<ul style="list-style-type: none"> <li>Participate in new exploration projects through joint ventures and make preparations to acquire new mines to obtain new operatorship</li> </ul>
<b>KPI 1. 3) Improve productivity by introducing new technology</b> <ul style="list-style-type: none"> <li>Promote remote operation and unmanned operation of heavy machinery and information infrastructure equipment inside and outside of the Hishikari Mine</li> </ul>			
<ul style="list-style-type: none"> <li>At the Hishikari Mine, proceeded with the provision of Wi-Fi in the mine under a three-year plan, and introduced our first automated driving and ground-based remote control system for the underground load haul dump (LHD) loaders that load and transport ores, launching operational tests in tunnels</li> </ul>	<ul style="list-style-type: none"> <li>Continue to provide Wi-Fi in the mine and test LHD loader automated driving, and work to further enhance operational efficiency by means including introduction of new technologies such as drilling machines with navigation functions and semi-automated long-hole drilling machines, and improvement of the waste stone rate through the introduction of new ore sorters</li> </ul>	<ul style="list-style-type: none"> <li>Establish ICT infrastructure (Wi-Fi) and begin introduction of (1) automated LHD loaders; (2) automated drilling machinery; and (3) remote operation and monitoring of heavy machinery and vehicles, etc. at the Hishikari Mine</li> </ul>	<ul style="list-style-type: none"> <li>Firmly establish (1) automated LHD loaders; (2) automated drilling machinery; and (3) remote operation and monitoring of heavy machinery and vehicles, etc. (plan to introduce some during the 2024 3-Year Business Plan) and begin further introduction of new technology at the Hishikari Mine</li> </ul>
<ul style="list-style-type: none"> <li>Based on status of introduction of new technology at the Hishikari Mine, examine more specific measures for promoting remote operation and unmanned operation of heavy machinery and information infrastructure equipment inside and outside the mine</li> </ul>			



Effective Use of Non-Ferrous Metal Resources

FY2022 Results	FY2023 Plan		Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 1.4) Advance nickel ore projects and improve productivity</b> • Nickel production: 150 kt/year • Ni Recovery rate compared to FY2018: +2%				
<ul style="list-style-type: none"> <li>Accelerated examination of new nickel projects to replace the Pomalaa Project</li> <li>CBNC fell short of target due to fluctuations in ore quality, but THPAL achieved target</li> </ul>	<ul style="list-style-type: none"> <li>Narrow down new nickel projects and continue detailed study</li> <li>Maintain and improve Ni recovery rate</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Increase production volume to achieve 150 kt/year</li> <li>Maintain and increase Ni recovery rate</li> </ul>	<ul style="list-style-type: none"> <li>Increase production volume to achieve 150 kt/year</li> <li>Maintain and increase Ni recovery rate</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Continue to develop technology and improve processes to increase production volume</li> <li>Continue to improve processes through technology development, etc.</li> <li>Search for new nickel mineral sources</li> </ul>	<ul style="list-style-type: none"> <li>Continue to develop technology and improve processes to increase production volume</li> <li>Continue to improve processes through technology development, etc.</li> <li>Search for new nickel mineral sources</li> </ul>
<b>KPI 1.4) Advance nickel ore projects and improve productivity</b> • Recovery of scandium by-product • Recovery of chromite by-product				
<ul style="list-style-type: none"> <li>Achieved record-high production volume of scandium</li> <li>Achieved record-high production volume of chromite</li> </ul>	<ul style="list-style-type: none"> <li>Increase scandium production volume</li> <li>Increase chromite production volume</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Increase production volume to design capacity</li> </ul>	<ul style="list-style-type: none"> <li>Maintain production volume at design capacity</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Ensure Sc recovery rate and increase production volume</li> </ul>	<ul style="list-style-type: none"> <li>Ensure Cr recovery rate and maintain production volume</li> </ul>
<b>KPI 2.1) Develop technology to separate, stabilize and bleed off, and create value for impurities generated by smelting processes and mines</b> • Develop technology to stabilize and bleed off impurities: Develop and demonstrate the process				
<ul style="list-style-type: none"> <li>Studied the application of technology for separation of arsenic from copper concentrates to future operations and to other separation technologies, investigating overseas research and development cases and drawing on our knowledge obtained from research results to date</li> </ul>	<ul style="list-style-type: none"> <li>Continue studying latest research cases</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Utilize knowledge gained through research</li> </ul>	<ul style="list-style-type: none"> <li>Utilize knowledge gained through research</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Examine use of knowledge gained through research in future mine operations and other separation technology</li> </ul>	<ul style="list-style-type: none"> <li>Examine use of knowledge gained through research in future mine operations and other separation technology</li> </ul>
<b>KPI 2.2) Develop technology to create value from unused non-ferrous metal resources</b> • Contribute to existing (e.g. marine resource development) and new development projects				
<ul style="list-style-type: none"> <li>In the final year of a five-year plan formulated by the government, leveraged our technical knowledge to participate in massive sulfide deposit and cobalt-rich ferromanganese crust projects</li> </ul>	<ul style="list-style-type: none"> <li>Plan to participate in projects targeting sea-floor massive sulfide deposits, cobalt-rich ferromanganese crust, etc. based on the next Ocean Energy &amp; Mineral Resource Development Plan to be formulated by the Ministry of Economy, Trade and Industry</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Participate in some form in the next Ocean Energy &amp; Mineral Resource Development Plan (FY2023 onward) to be formulated by the Ministry of Economy, Trade and Industry</li> </ul>	<ul style="list-style-type: none"> <li>Participate in some form in the next Ocean Energy &amp; Mineral Resource Development Plan (FY2023 onward) to be formulated by the Ministry of Economy, Trade and Industry</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Contribute in the role of industry by participating in research and development JVs for individual projects, in Japan Organization for Metals and Energy Security (JOGMEC) committees for exploration, mining, ore lifting, mineral processing, smelting and refining, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Contribute in the role of industry by participating in research and development JVs for individual projects, in JOGMEC committees for exploration, mining, ore lifting, mineral processing, smelting and refining, etc.</li> </ul>

FY2022 Results	FY2023 Plan		Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 2.3) Recover non-ferrous metal from hard-to-process resources</b> • Participate in business and technology for recovery of lithium from salt-lake water in the presence of high levels of impurities				
<ul style="list-style-type: none"> <li>Conducted conceptual design and preliminary capital expenditure (CAPEX) estimation to evaluate the commercial potential of direct lithium extraction (DLE) technology</li> <li>Reduced freshwater usage in the DLE process close to the target</li> <li>Promoted development of adsorbent through joint research with universities</li> </ul>	<ul style="list-style-type: none"> <li>Start pilot trials using actual brine water</li> <li>Continue to study commercialization</li> <li>Achieve target water usage in the DLE process</li> <li>Continue the development of adsorbent through joint research</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Develop adsorbent for practical use and manufacturing processes for lithium chemicals</li> <li>Demonstrate process feasibility through on-site pilot tests, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in construction and operation of commercial plant (plan to implement study of commercialization model during the 2024 3-Year Business Plan)</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Improve adsorbent through joint research with Universities</li> <li>Design overall process and verify economic feasibility</li> </ul>	<ul style="list-style-type: none"> <li>Participate in lithium operations and stabilize product quality</li> <li>Items or targets to be implemented during the 2024 3-Year Business Plan</li> <li>Obtain data for feasibility study through demonstration plant</li> <li>Conduct design and feasibility study of commercial plant</li> </ul>
<b>KPI 3. Demonstrate and commercialize recycling technology for automobile secondary battery</b> • Demonstrate, commercialize, and expand scale of recycling technology that recovers cobalt from automotive lithium-ion batteries Commence commissioning and commercial operation of pre-commercial plant: FY2026				
<ul style="list-style-type: none"> <li>In studies of processes for recovery of copper, nickel, cobalt and lithium at the pilot plant, (1) passed users' evaluations of properties of batteries made with recovered nickel and cobalt, and (2) optimized pretreatment methods aimed at greenhouse gas (GHG) reduction</li> </ul>	<ul style="list-style-type: none"> <li>Continue to study processes aimed at GHG reduction</li> <li>Start construction work on pre-commercial plant</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Continue construction work on pre-commercial plant (Start test operation of pre-commercial plant in FY2026)</li> </ul>	<ul style="list-style-type: none"> <li>Processing of 10,000 t/year at pre-commercial plant</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Continue construction work on pre-commercial plant</li> </ul>	<ul style="list-style-type: none"> <li>Improve technology to increase processing volume of its pre-commercial plant</li> </ul>
<b>KPI 4.1) Leverage our strengths to create new products and new businesses that contribute to society</b> • Research, develop, and commercialize new advanced materials in the fields of energy, automobiles, and information communications				
<ul style="list-style-type: none"> <li>Explored new themes using a new business creation system</li> <li>Established the GX Materials Science Co-Creation Research Center in cooperation with Tohoku University and launched search for themes related to a hydrogen-based society and future batteries</li> </ul>	<ul style="list-style-type: none"> <li>Narrow down new theme candidates explored using the new business creation system, through market research and collaboration with universities</li> <li>In co-creation of a vision with Tohoku University, continue to explore themes aimed at the achievement of a solar energy society; at the GX Materials Science Co-Creation Research Center, continue to explore themes of a hydrogen-based society and future battery materials, and propose new candidate themes</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>Study potential R&amp;D themes that will lead to commercialization</li> <li>Implement working group activities and activities such as joint research on future co-creation with universities</li> </ul>	<ul style="list-style-type: none"> <li>Move on to the next stage of R&amp;D themes with a view to commercialization</li> <li>Continue joint research with universities on new businesses</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>Operate new business creation system and manage progress of research themes</li> <li>Develop human resources and explore themes utilizing new working group activities and co-creation activities with universities</li> <li>Use our X-MINING information dissemination website and take part in exhibitions</li> </ul>	<ul style="list-style-type: none"> <li>Continually improve activities aimed at new business creation</li> <li>Items or targets to be implemented during the 2024 3-Year Business Plan</li> <li>Operate new business creation system and manage progress of research themes</li> <li>Continually develop human resources to create new businesses and new themes</li> <li>Continue to disseminate information, including at exhibitions</li> </ul>

Effective Use of Non-Ferrous Metal Resources

FY2022 Results	FY2023 Plan	Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 4.2) Hold raw materials in-house for favorable and stable procurement</b> • Commercialize NiO for fuel cells following demonstration project			
<ul style="list-style-type: none"> <li>Continued demonstration tests at pilot plant</li> </ul>	<ul style="list-style-type: none"> <li>Continued demonstration tests at pilot plant</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Continued demonstration tests at pilot plant</li> <li>Decide on investment in mass production based on feasibility study</li> </ul>	<ul style="list-style-type: none"> <li>Expand business size to accommodate sustained growth of fuel cell battery market</li> <li>Items or targets to be implemented during the 2024 3-Year Business Plan</li> <li>Introduce mass production equipment and expand business size</li> <li>Establish business profitability</li> </ul>
		<b>Action Plan</b> <ul style="list-style-type: none"> <li>Improve profitability by reducing production costs and optimizing selling prices</li> <li>Prepare for mass production (installation location, design, and quotations) and carefully examine market</li> <li>Decide on investment in mass production based on feasibility study</li> </ul>	<ul style="list-style-type: none"> <li>Continually assess business feasibility and make decisions on investment in boosting production</li> <li>Gain further competitive advantage (cost, technology, etc.)</li> <li>Items or targets to be implemented during the 2024 3-Year Business Plan</li> <li>Introduce mass production equipment and start up as soon as possible</li> <li>Achieve business profitability by expanding sales</li> </ul>
<b>KPI 4.3) Expand sales of low-cost battery cathode materials through favorable, stable procurement of our own nickel raw materials</b> • Maintain top class global share in the expanding cathode materials market			
<ul style="list-style-type: none"> <li>Continued to advance construction, staff recruitment, etc. according to plan for 2,000 t/month expansion, with the aim of starting test operation in FY2024</li> <li>Conducted surveys and studies related to next production expansion</li> </ul>	<ul style="list-style-type: none"> <li>Make decision on implementation of 2,000 t/month expansion according to plan and on implementation of post-processing equipment expansion</li> <li>Continue to conduct surveys and studies related to next production expansion</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Expand production capacity for cathode materials to reach 7,000 t/month (complete in FY2025)</li> <li>Maintain top class share of market</li> </ul>	<ul style="list-style-type: none"> <li>Construct 15,000 t/month production capacity for cathode materials</li> <li>Maintain top class share of market</li> <li>Items or targets to be implemented during the 2024 3-Year Business Plan</li> <li>Establish 10,000 t/month production capacity for cathode materials</li> <li>Maintain top class share of market</li> </ul>
		<b>Action Plan</b> <ul style="list-style-type: none"> <li>Establish stable production of 4,850 t/month</li> <li>Expand production by 2,000 t/month</li> </ul>	<ul style="list-style-type: none"> <li>Aim for 15,000 t/month production capacity (Aim for 10,000 t/month during the 2024 3-Year Business Plan)</li> </ul>

Contribution to a Circular Economy (effective use of resources)

Recycling of Low-Grade Nickel Oxide Ores

Smelting and refining of low-nickel-content oxide ores found near the earth's surface involves numerous technical challenges that made it difficult to achieve on a commercial basis. However, such low-grade oxide ores are said to account for about 70% of the world's nickel oxide mineral resources, which lead to worldwide demand for development of technology to enable its processing. Drawing on our advanced equipment engineering and operation technologies, in April 2005 our Group led the world in achieving large-scale commercial production via the hydrometallurgical processing technology known as HPAL at Coral Bay Nickel Corporation (CBNC)<sup>1</sup> in the Philippines.

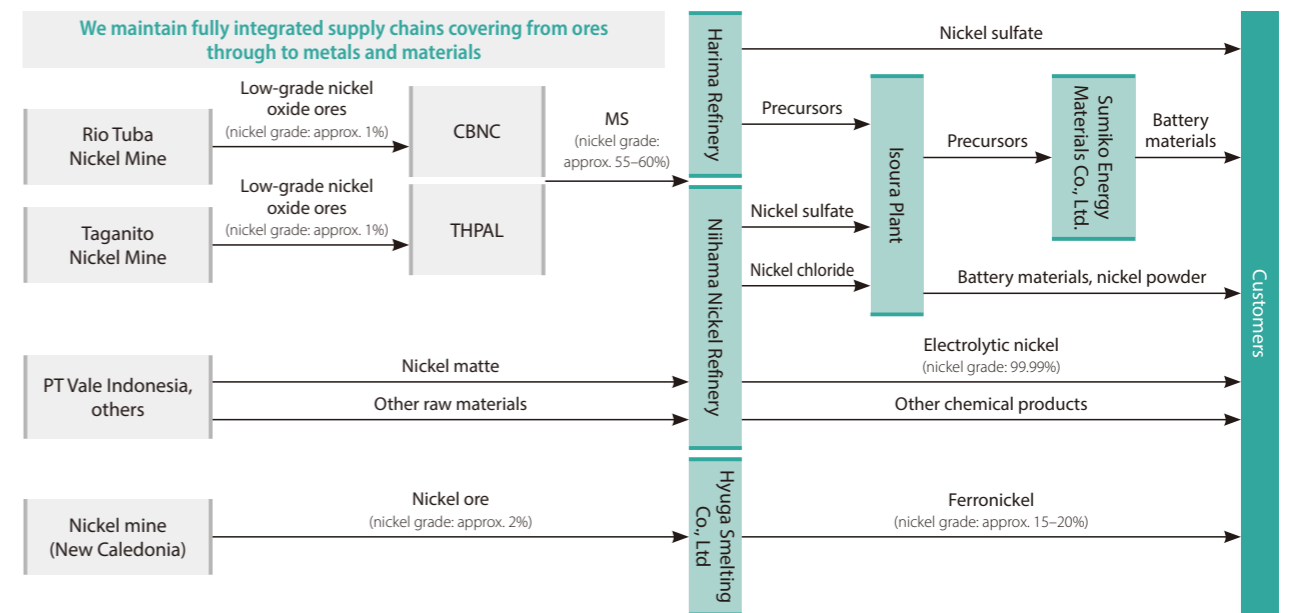
In 2013, Taganito HPAL Nickel Corporation (THPAL)<sup>2</sup> began operation as our second HPAL plant. The nickel intermediate smelted and refined at the two HPAL plants is used in Japan as electrolytic nickel and as secondary battery cathode material for electric vehicles. We also recover and recycle cobalt contained in the intermediate and scandium and chromite contained in the ore.

1. Coral Bay Nickel Corporation (CBNC): Shareholders: Sumitomo Metal Mining Co., Ltd. (84.375%); Nickel Asia Corporation (15.625%). Head Office: Rio Tuba, Bataraza, Palawan Province, Philippines  
 2. Taganito HPAL Nickel Corporation (THPAL): Shareholders: Sumitomo Metal Mining Co., Ltd. (75%); Mitsui & Co., Ltd. (15%); Nickel Asia Corporation (10%). Head Office: Taganito, Surigao del Norte Province, Philippines



Low-grade nickel oxide ore for THPAL

Supply Chains for Realizing a Stable Supply of Nickel



Effective Use of Non-Ferrous Metal Resources

Battery Recycling

As automobiles undergo what is expected to be a rapid and long-term shift to electric drive and battery capacity becomes increasingly higher, demand is growing for the copper, nickel, cobalt, and lithium used in lithium-ion secondary batteries (LIBs) for electric vehicles, leading to calls for effective resource recycling.

Since 2017, we have been working to recover and reuse the copper and nickel contained in LIBs through a process that combines the Toyo Smelter & Refinery's copper smelting and refining processes and the Niihama Nickel Refinery's nickel smelting and refining processes. The recovered nickel, in particular, is processed into a secondary battery cathode material at the Isoura Plant, realizing Japan's first "battery to battery" horizontal recycling using materials recovered from used LIBs.

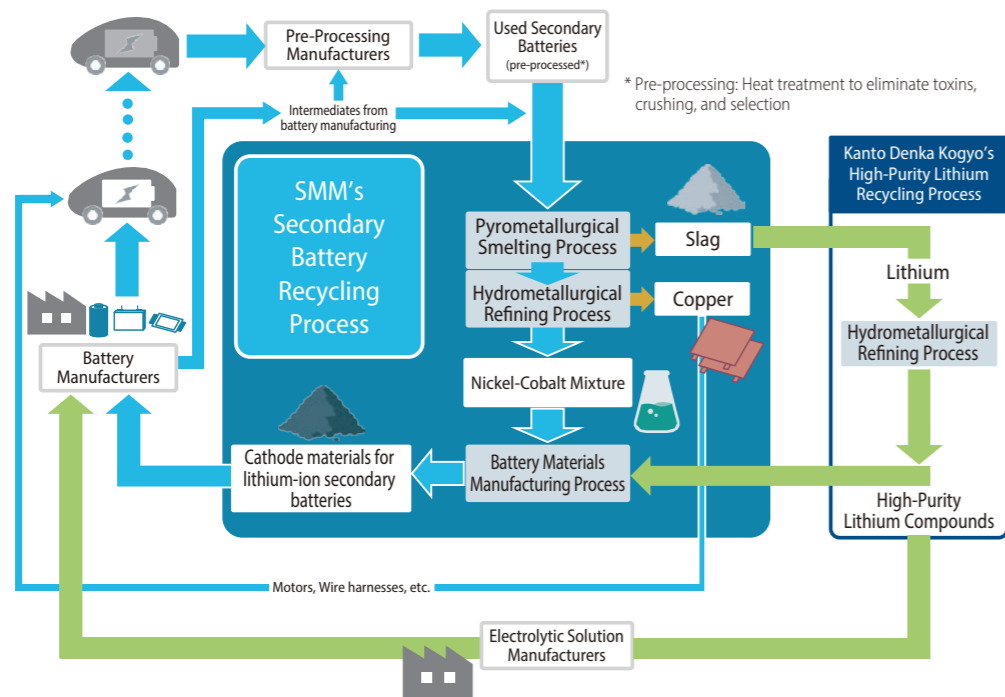
In addition to this, we have been promoting LIB recycling research and development and demonstrated in 2021 that cobalt, for which resource depletion is a concern, can also be recovered, purified to a high level, and reused as a raw material for LIB cathode materials. Moreover, through joint development with Kanto Denka Kogyo Co., Ltd., we established technology that recycles lithium from slag containing lithium into high-purity compounds in 2022, successfully developing a new process for horizontal recycling of copper, nickel, cobalt, and lithium.

In evaluations of battery performance by battery user Primearth EV Energy Co., Ltd., it was demonstrated on the product level that the performance of batteries using LIB cathode materials manufactured through this process is equal to that of batteries manufactured from conventional raw materials, primarily derived from natural resources.

We are currently studying the commercialization of battery recycling with the aim of establishing a system for processing 10,000 tons per year during the term of the 2024 3-Year Business Plan (FY2025–2027). In parallel with this, we are also working to develop technology for reducing CO<sub>2</sub> emissions from the perspective of carbon neutrality. If this new process makes it possible to reuse valuable metals as resources on a commercial basis, it can be expected to make a further contribution to resource recycling to combat global resource depletion.

Looking ahead, we will continue to actively work on "battery to battery" horizontal recycling and will contribute to the formation of a sustainable circular economy and the strengthening of resource recycling to combat global resource depletion.

Recycling Flow

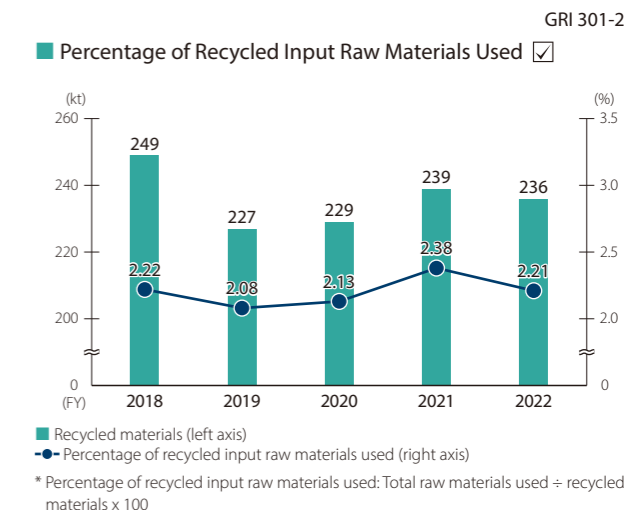


Other Recycling Initiatives

Percentage of Recycled Input Raw Materials Used

The SMM Group procures copper scrap and precious metal scrap from the market, recovers zinc from electric arc furnace dust, and recovers valuable and precious metals from used printed circuit boards and other sources. In FY2022, our percentage of recycled input raw materials used was approximately 236 kt, accounting for 2.21% (2.38% in FY2021) of input raw materials, a slight drop from the previous fiscal year. Production volume of electrolytic copper from recycled raw materials was approximately 93 kt, accounting for 20.9% (23.1% in FY2021) of production volume, a slight drop from the previous fiscal year.

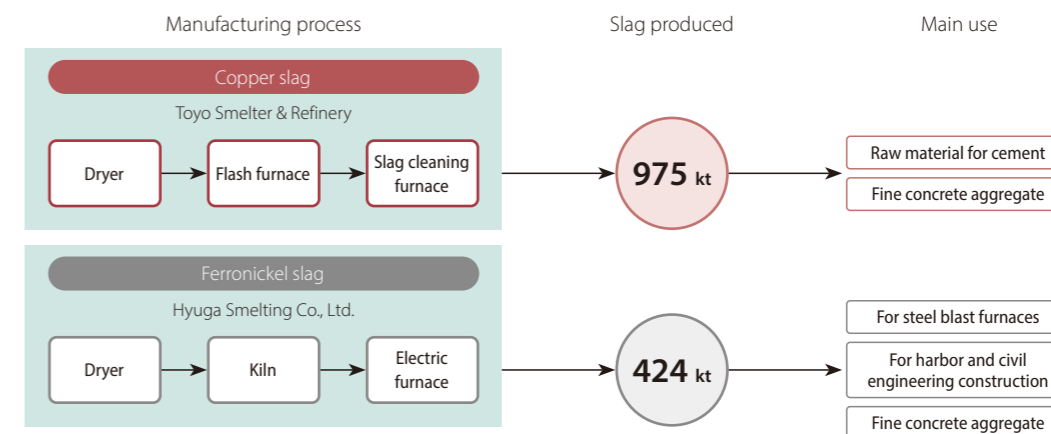
Percentage of Recycled Input Raw Materials Used P.70



Slag as a Recycled Material

Copper slag is a by-product produced during smelting at the Toyo Smelter & Refinery, which manufactures electrolytic copper. The main use for copper slag (70% of the total volume) is cement production for Japan and overseas. With an iron content of about 40%, copper slag is widely used as a source of iron for cement.

The ferronickel slag at Hyuga Smelting Co., Ltd., which manufactures ferronickel used as a raw material for stainless steel, is mainly used at steel blast furnaces. With a magnesia content of about 30%, ferronickel slag is used as a source of magnesia for blast furnace flux.

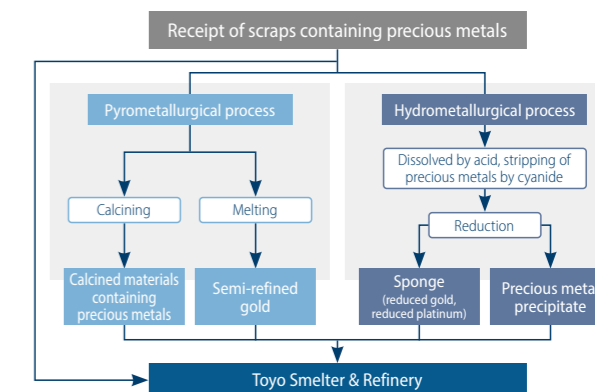


Precious Metal Recovery: Flow Diagram

Discarded household appliances and discarded electronic parts collected nationwide, and E-scrap containing high concentrations of gold, silver, copper, palladium, and other valuable metals generated in the manufacturing of these appliances and parts, provide SMM with raw materials for the recovery and recycling of precious metals (gold, silver, platinum, etc.).

After sorting the collected raw materials into parts that contain precious metals and those that do not, the SMM Group company Ohkuchi Electronics Co., Ltd. uses the pyrometallurgical or hydrometallurgical process, depending on the composition and other aspects of the parts, to condense the materials before transporting them to the Toyo Smelter & Refinery.

The Toyo Smelter & Refinery smelts and refines those condensed raw materials along with other copper and precious metal raw materials, and then recycles them into high-grade precious metals.



# Environmental Management

Sumitomo Metal Mining Group Environmental Targets for 2023		GRI 3-3
<b>FY2023 Policy</b>	Use an environmental management system (EMS) to strengthen environmental management, address global environmental issues, and preserve biodiversity.	
<b>FY2023 Targets</b>	<ol style="list-style-type: none"> <li>1. Eliminate environmental accidents and compliance breaches</li> <li>2. Reduce greenhouse gas (GHG) emissions</li> <li>3. Promote preservation of biodiversity</li> </ol>	

## Promotion Structure

GRI 3-3

### Deploy Environmental Targets and Use an Environmental Management System

Based on our Group's environmental vision and progress toward it, the Safety & Environment Control Department formulates a proposal for the Group's environmental targets (policies, objectives, strategies), which are reviewed and approved by the president. At each business site, annual targets and plans are developed based on the Group's environmental targets, taking into account the unique risks of each site, and are carried out through the EMS based on ISO 14001 (JIS Q 14001). As of April 1, 2023, all our production sites have obtained third-party ISO 14001 certification.

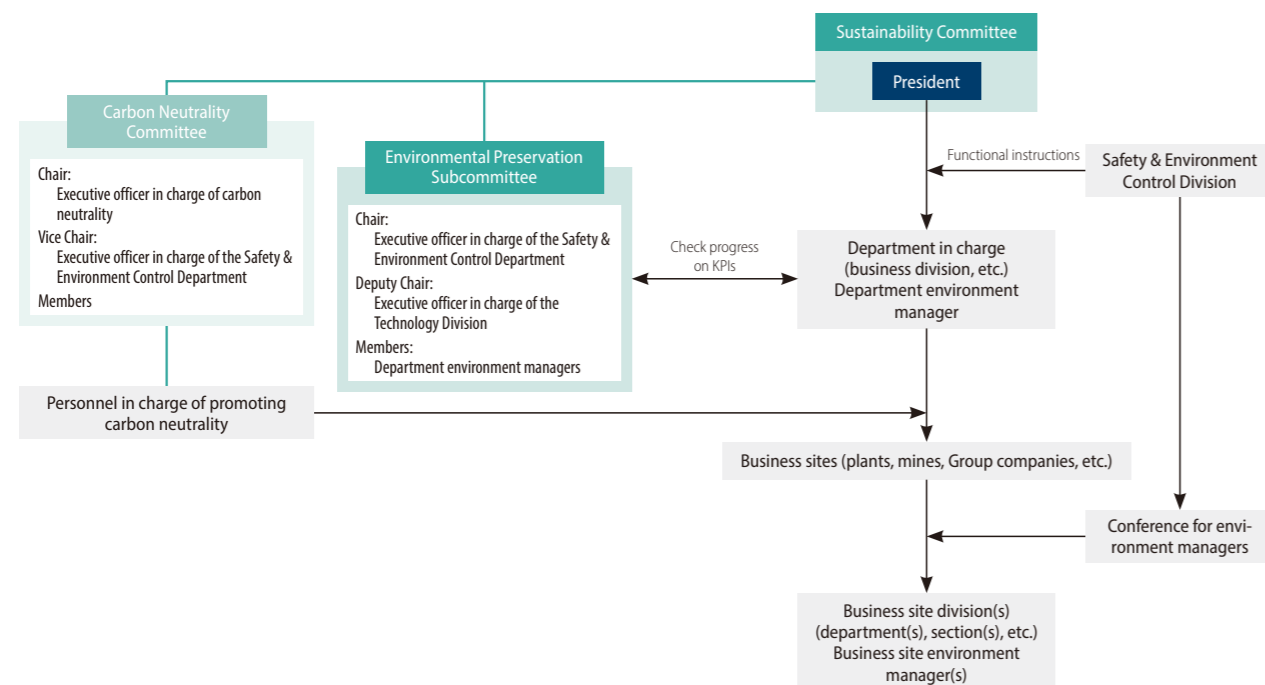
### The Environmental Preservation Subcommittee and the Safety & Environment Control Department

The Safety & Environment Control Department serves as the secretariat of the Environmental Preservation Subcommittee with respect to significant environmental accidents and biodiversity which are material issues. The Department is the functional instructing department with respect to environmental preservation activities in general, promoting initiatives through the cooperation and collaboration of various departments to realize the Vision. This includes the operations of the Environmental Preservation Subcommittee, functional instructions to site managers based on legal revisions and other external information, various reports and inspections, and alerts and inspection directives through the sharing information about environmental accidents and near-miss cases within the Group.

### The Carbon Neutrality Committee and the Technology Division

Regarding climate change, which is a material issue, the Technology Division serves as the secretariat and functional instruction division for the Carbon Neutrality Committee,\* driving activities through collaboration and cooperation with various departments

#### Promotion Structure



to achieve the Group's Vision. It runs the Carbon Neutrality Committee, formulates the policy, targets, and plans to achieve carbon neutrality and deliberates on material issues, collecting external information (from guidelines of affiliated organizations, international trends, regulatory revisions, etc.) and performance data, sharing case studies with other departments, and deliberates on and approves the internal carbon pricing (ICP) system.

\* Carbon Neutrality Committee P.23

### Conference for Environment Managers

Conferences for environment managers are held in principle once per year and are attended by environment managers from all business sites. In these meetings, we aim to enhance the capabilities of these managers through education and discussion on the progress of environmental objectives, updates on legal amendments and compliance status, as well as environmental performance and priority areas of focus.

## Individual Initiatives for Environmental Preservation

### Inspections, Communications

The head of the department overseeing a business site conducts an annual inspection of the business site, including the business sites of the Group companies it oversees. In addition, the General Manager of the Safety & Environment Control Department inspects designated business sites, including those of Group companies, to ensure that proper environmental management practices are in place.

Further, the Safety & Environment Control Department conducts environmental communication activities to assess environmental issues at each business site by visiting designated sites, including those of Group companies. Findings from the inspection by the General Manager of the Safety & Environment Control Department are reported to the heads of the business sites and the department responsible, as well as the president of SMM. Upon sharing the identified issues, efforts are made to enhance environmental management levels at the respective business sites.

### Environmental Management in the Besshi District

In the Besshi District (Niihama City, Ehime Prefecture, and its suburbs), where many of our Group's manufacturing bases are located, the Besshi-Niihama District Division Safety & Environment Control Center plays a central role in enhancing environmental management standards. This involves offering guidance on environmental management initiatives to business sites including Group companies in the district. The Center also offers regular opportunities to exchange information, study sessions, and conducts mutual patrolling to improve environmental practices.

### Education

In addition to providing e-learning as an educational tool for laws and regulations and environmental management, we offer training for EMS internal auditors, and environmental management education for newly appointed business site general managers, the environment managers, new employees, and mid-career hires to enhance environmental management levels.

## Environmental Preservation Initiatives at Business Sites

Through EMS, each business site conducts activities on a regular basis to improve the level of environmental management through the PDCA cycle. Such activities include evaluations of the effect on the environment of the business' activities (environmental risk assessment), formulation and execution of environmental management, preventive environmental preservation activities, tracking through internal and third-party audits, management reviews, and emergency response training in case of accidents.

Environmental Preservation Investment as a Part of Facility Investments P.72



# Climate Change

## Vision for 2030

**A company that actively undertakes climate change countermeasures, by reducing emissions and stably supplying products contributing to a low-carbon society, a future with zero greenhouse gases (GHGs)**

### Approach and Policy

GRI 3-3

As a group that produces a significant amount of greenhouse gas (GHG) emissions through our business activities, we are committed to contributing to mitigating climate change by reducing global GHG emissions. We will do this by reducing absolute emissions and emissions intensity through operational improvements and technological innovation, as well as expanding our business through the development of products that contribute to a low-carbon society, such as battery materials and near-infrared absorbing materials.

### Management Structure and Approach regarding the Material Issue of Climate Change (based on the TCFD recommendations)

GRI 3-3

#### Governance

The Group's material issues related to sustainability, including climate change, are identified along with KPIs through discussion by senior management members and confirmed through a resolution of the Board of Directors. Climate risks, opportunities, and strategy pertaining to the Group are also reflected in 3-Year Business Plans, annual budgets, KPI targets, and other areas, and are confirmed through a resolution of the Board of Directors. The Carbon Neutrality Committee meets regularly to deliberate on and manage climate change-related matters pertaining to the Group. Initiatives and performance in regard to KPI targets are then reviewed by the Sustainability Committee and an overview is reported to the Board of Directors.

#### Strategy

Short-, medium-, and long-term climate change risks and opportunities that could have a major impact on the Group's business, strategy, or finances are identified based on analysis of climate change scenarios that anticipate various changes in the external environment, including regulatory changes, technological progress, market changes, and natural disasters. We then consider the impact of each of these on business and strategy in each area, such as products and services, R&D investment, operations, and GHG emission reduction and response measures. Based on the results of this analysis, we formulate Group strategies for each climate change risk and opportunity, and these are reflected in 3-Year Business Plans. These strategies are also discussed by the Carbon Neutrality Committee and reviewed by the Sustainability Committee.

#### Risk Management

The climate change risks identified through scenario analysis are monitored and measured by the Carbon Neutrality Committee, which also takes corrective measures and revises strategies when necessary, and are reviewed by the Sustainability Committee. Climate change risk is also managed by the Group's risk management system and Risk Management Working Group, based on consideration of the impact on other individual risks such as occupational accidents, environmental pollution, quality failures, and legal violations.

### Metrics and Targets

We have established the goal of achieving carbon neutrality by 2050. In order to achieve this goal, we have set GHG emissions targets for 2030 and we are advancing activities for meeting these targets. We have also set and are pursuing targets for contribution to reducing GHG emissions at a society-wide level through the supply of secondary battery cathode materials for use in automobiles and near-infrared absorbing materials produced by the Group.

### Medium-Term Targets and Progress

GRI 3-3

To achieve our Vision for 2030, we are managing progress for each KPI and have made achievement criteria and action plans for up to 2030.

FY2022 Results	FY2023 Plan		Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI Reduce GHG emissions</b>				
<b>1. Continuing to grow our business while maintaining GHG emissions below the level of FY2013. Accelerating actions to achieve net zero GHG emissions by 2050 or sooner</b>				
<ul style="list-style-type: none"> <li>• GHG emissions were 2,820 kt-CO<sub>2</sub>e (an increase of 5% compared to FY2013)</li> <li>• Adopted an internal carbon pricing (ICP) system and promoted investment in reducing GHG emissions</li> <li>• Purchased substantial renewable energy</li> <li>• Advanced development of innovative smelting and refining processes</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce energy intensity by at least 1% by using highly efficient facilities, improving processes, and other methods</li> <li>• Advance investment in reducing GHG emissions (fuels transition, introduction of renewable energy, etc.) using the ICP system</li> <li>• Purchase substantial renewable energy</li> <li>• Continue development of innovative smelting and refining processes</li> <li>• Update climate change scenario analyses</li> <li>• Develop a roadmap for realizing carbon neutrality by 2050</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>• Maintain GHG emissions below the level of FY2013</li> <li>• Develop a roadmap for realizing carbon neutrality by 2050</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce GHG emissions in line with targets and achieve KPI targets during each 3-Year Business Plan period</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>• Implement measures for the 2021 3-Year Business Plan period and for each year with regard to reducing GHG emissions</li> <li>• Plan and expand various measures and confirm the suitability of KPI targets for realizing carbon neutrality by 2050</li> </ul>	<ul style="list-style-type: none"> <li>• Implement the roadmap for achieving KPIs</li> <li>• Verify and revise roadmap and various associated measures</li> </ul>
<b>KPI Reduce GHG emissions</b>				
<b>2. Reduce GHG emissions intensity by at least 26% compared to FY2013</b>				
<ul style="list-style-type: none"> <li>• Reduced GHG emissions intensity by approximately 1% compared to FY2013</li> <li>• Advanced investment in reducing GHG emissions using the ICP system</li> <li>• Purchased substantial renewable energy</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce energy intensity by at least 1% through stable operations, production increases, and other methods</li> <li>• Advance investment in reducing GHG emissions using the ICP system</li> <li>• Purchase substantial renewable energy</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>• Reduce GHG emissions intensity toward achieving the KPI target</li> </ul>	<ul style="list-style-type: none"> <li>• Achieve the KPI target by reducing GHG emissions intensity in line with the targets of each 3-Year Business Plan</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>• Implement the measures for the 2021 3-Year Business Plan period and for each year with regard to reducing GHG emissions</li> <li>• Plan and expand various measures, and confirm the suitability of KPI targets for achieving reductions in GHG emissions intensity</li> </ul>	<ul style="list-style-type: none"> <li>• Implement measures for each 3-Year Business Plan period and for each year to achieve KPI targets</li> <li>• Verify and revise various measures</li> </ul>
<b>KPI Reduce GHG emissions</b>				
<b>3. Expand contribution of GHG reduction by products contributing to a low-carbon society: 600 kt-CO<sub>2</sub> or more</b>				
<ul style="list-style-type: none"> <li>• Avoided emissions of 540 kt-CO<sub>2</sub> through the supply of products contributing to a low-carbon society, including a near-infrared absorbing material for automobiles (CWO*) and battery materials</li> </ul>	<ul style="list-style-type: none"> <li>• Increase production of battery materials and CWO*, and advance product development</li> </ul>	Achievement Criteria	<ul style="list-style-type: none"> <li>• Increase avoided emissions by products contributing to a low-carbon society</li> <li>• Increase number of products contributing to a low-carbon society and revise KPI targets</li> </ul>	<ul style="list-style-type: none"> <li>• Increase avoided emissions by products contributing to a low-carbon society and achieve KPI targets during each 3-Year Business Plan period</li> </ul>
		Action Plan	<ul style="list-style-type: none"> <li>• Implement the measures for the 2021 3-Year Business Plan period and for each year with regard to increasing the number of products contributing to a low-carbon society</li> <li>• Conduct investigation and review to increase the number of products contributing to a low-carbon society (R&amp;D and market development), plan measures and confirm suitability of KPI targets</li> </ul>	<ul style="list-style-type: none"> <li>• Implement measures for each 3-Year Business Plan and for each year to achieve KPI targets</li> <li>• Conduct investigation and review to increase the number of products contributing to a low-carbon society (R&amp;D and market development), and verify and revise measures</li> </ul>

Climate Change

Action for TCFD

In February 2020, we became a supporter of the Task Force on Climate-related Financial Disclosures (TCFD). We have not only listed climate change as a material issue in Vision for 2030, which was formulated and released in March 2020, and strengthened efforts to achieve the vision of “a company that actively undertakes climate change countermeasures, by reducing emissions and stably supplying products contributing to a low-carbon society, a future with zero greenhouse gases (GHGs),” but also indicated that we will

move forward with disclosure of related information. The TCFD recommends that the disclosure of climate change-related risks and opportunities should be organized according to four core elements of corporate management and operations (governance, strategy, risk management, and metrics & targets), and we are disclosing information in line with these recommendations.

The Group responds to the CDP Climate Change Questionnaire annually regarding its GHG management.

Climate Change Scenario Analysis

GRI 201-2

We considered two scenarios for 2050.

**1.5°C scenario** A scenario in which ongoing efforts are made to keep the rise in average temperatures to within 1.5°C. The IEA's WEO 2019 Sustainable Development Scenario (SDS),<sup>1</sup> Beyond 2°C Scenario (B2DS),<sup>2</sup> and the IPCC's special report “Global Warming of 1.5°C”<sup>3</sup> were information sources for this scenario.

**4°C scenario** A scenario in which no countermeasures are taken, and temperatures are allowed to continue rising. Information sources included the IEA's WEO 2018 New Policies Scenario and the IPCC's RCP<sup>4</sup> 8.5 Scenario.

1. A scenario published by the International Energy Agency (IEA), and adopted in World Energy Outlook (WEO) 2019, a report that presents the outlook for energy supply and demand and technological developments, and analyzes the path that should be followed to fully achieve the goals set forth in the Paris Accords  
 2. A scenario in “Energy Technology Perspectives 2017” (ETP 2017) published by the IEA  
 3. A report published by the Intergovernmental Panel on Climate Change (IPCC)  
 4. Representative Concentration Pathways (RCP)

Scenario	Category	Driver	Anticipated situation (2050)	Impact on business	Risk and opportunity (medium- to long-term)	SMM Group approach: Initiatives for realizing Vision for 2030
1.5°C	Climate change policy	Carbon pricing (carbon taxes, emissions trading, etc.)	• Overall monetary amounts have risen (depending on nation or region)	Increased tax burden, etc. Increases in R&D costs and investment in low-carbon facilities and equipment	Risk Large Short- to long-term, large	• Climate Change: Reduce GHG emissions P42-50 • Climate Change: Reduce GHG emissions P42-50 • Effective Use of Non-Ferrous Metal Resources P32-39 Improve productivity by introducing new technology, Advance nickel ore projects and improve productivity
	Climate change policy	Tightening of vehicle regulations, policy to promote LEVs	• Fuel consumption regulations have been tightened and restrictions on movement introduced • Policy is supportive of EVs and LEVs • Internal combustion-based vehicles have been replaced by LEVs	• Increase in sales due to growing demand for batteries and nickel accompanying the spread of EVs		• Climate Change: Reduce GHG emissions P42-50 • Effective Use of Non-Ferrous Metal Resources P32-39 Advance nickel ore projects and improve productivity, Develop technology to create value from unused non-ferrous metal resources, Leverage our strengths to create new products and new businesses that contribute to society, Hold raw materials in-house for favorable and stable procurement, Expand sales of low-cost battery cathode materials through favorable, stable procurement of our own nickel raw materials
	Society and infrastructure	Progress of digital transformation related to vehicles, changes in values	• Self-driving vehicles, MaaS <sup>5</sup> , and car-sharing are common • Fewer households own cars	• Increase in sales of nickel oxide powder and lithium-ion batteries accompanying the development of a hydrogen society and the spread of FCVs • Increase in sales of other products contributing to a low-carbon society	Opportunity Large	
	Technology	Development of hydrogen technology, fuel cells	• Fuel cell vehicles (FCV) are common • EVs and plug-in hybrid EVs (PHEV) are common			
	Climate change policy	Shift to electrical energy	• Electricity occupies a higher proportion of final energy consumption	• Increase in demand for copper accompanying the strengthening of electrical grids (although there is competition from aluminum, etc.)	Opportunity Large	• Effective Use of Non-Ferrous Metal Resources P32-39 Advance copper mine projects, Acquire new superior copper and gold resources
	Technology	Technological shift in automobile storage batteries	• There has been a shift in the market share of automobile storage batteries	• Rise in the proportion of nickel used in batteries and increased sales of nickel accompanying efforts to move away from cobalt • Spread of solid state batteries that leverage SMM technology as next-generation batteries • Spread of iron and manganese-based batteries accompanying efforts to move away from cobalt • Spread of new batteries that do not leverage SMM technology as next-generation batteries	Opportunity Medium Risk Medium	• Climate Change: Reduce GHG emissions P42-50 • Effective Use of Non-Ferrous Metal Resources P32-39 Advance nickel ore projects and improve productivity, Develop technology to create value from unused non-ferrous metal resources, Leverage our strengths to create new products and new businesses that contribute to society, Hold raw materials in-house for favorable and stable procurement, Expand sales of low-cost battery cathode materials through favorable, stable procurement of our own nickel raw materials
Society and infrastructure	Interest in matters such as sustainable procurement, environmental footprint, and the social impact of businesses	• There is greater awareness regarding sustainability • ESG investment is mainstream • There are more possible applications for alternative materials and recycled metals	• Limits on raw materials sourcing, increase in materials and manufacturing costs, greater advantages due to owning our own mines • Expansion of the automobile secondary battery recycling business • Impact of ESG investment on financing • Reputational risk if SMM's efforts are evaluated as insufficient	Opportunity Medium Risk Medium to large	• Effective Use of Non-Ferrous Metal Resources P32-39 Advance copper mine projects, Acquire new superior copper and gold resources, Advance nickel ore projects and improve productivity, Hold raw materials in-house for favorable and stable procurement, Demonstrate and commercialize automobile secondary battery recycling technology • Human Rights in the Supply Chain: P.120-123 Promote sustainable procurement, particularly responsible mineral sourcing • Rights of Indigenous Peoples: P.116-119 Understand indigenous peoples and their traditions and culture, Support initiatives that lead to respect for the traditions and cultures of indigenous peoples	
4°C	Temperatures and rainfall	Rises in average temperature, sea surface temperature, and sea levels	• Sea levels have risen • Storm surges are more frequent	Decline in port functionality, greater risk of storm surges, possibility of facility-based countermeasures needing to be taken at some coastal business sites	Risk Large	• Significant Environmental Accidents and Biodiversity: Zero significant environmental accidents P52-63
		Increase in abnormal climate events, such as heat waves, flooding, and water shortages	• Heavy rains and typhoons are more frequent • Increased risk of flooding and water shortages depending on region	Increase in risk of flooding or water shortages at business sites in certain regions, possibility of facility-based countermeasures needing to be taken	Risk Large	• Significant Environmental Accidents and Biodiversity: P52-63 Zero significant environmental accidents, Reduce emissions of hazardous substances
				Decline in operations at key suppliers, decline in plant operations due to interruptions to procurement and shipping routes Possibility of facility-based countermeasures needing to be taken due to the increased risk of damage to tailing dams	Risk Large	• Significant Environmental Accidents: Zero significant environmental accidents P56-57, P64-68

5. Mobility as a Service (MaaS): a service that optimally combines multiple transportation services (buses, trains, cabs, airplanes, etc.) and performs search, reservation, payment, etc. all at once



Climate Change

GHG Emissions (Scope 1 and 2)

GRI 305-1/305-2/305-5

Group GHG emissions for FY2022 were 2,823 kt-CO<sub>2</sub>e due to increases in production volumes, while direct GHG emissions reductions due to energy saving and other activities in FY2022 amounted to approximately 6 kt-CO<sub>2</sub>e. Additionally, the solar power plant operated by SMM in Kashima, Ibaraki Prefecture helped to reduce emissions by approximately 1.5 kt-CO<sub>2</sub>e in FY2022.

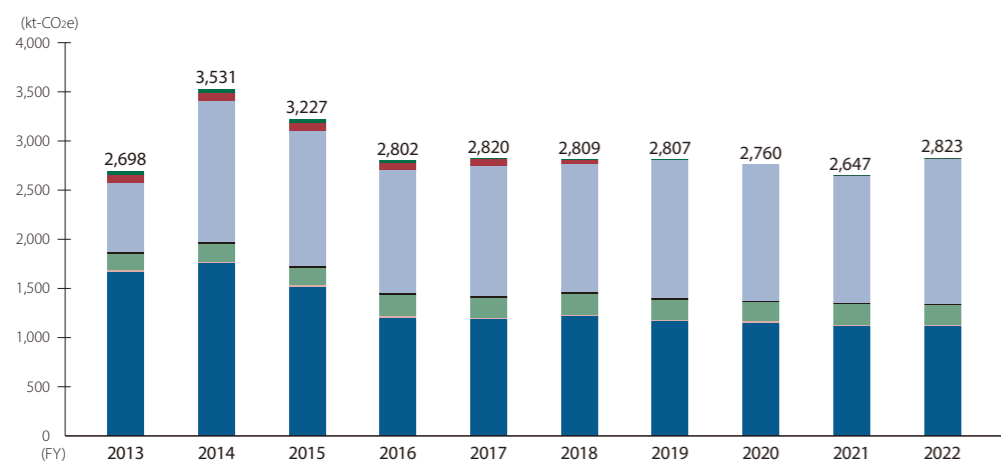
Details regarding Scope 3 GHG emissions are described on p. 50.

Scope 1: Direct GHG emissions generated by a business (due to fuel consumption, industrial processes, etc.)  
 Scope 2: Indirect GHG emissions generated through the use of electricity, heat, and steam supplied by other companies  
 Scope 3: Indirect GHG emissions not covered by Scopes 1 or 2 (emissions from other companies with a connection to the business' activities)

Breakdown of the SMM Group's GHG Emissions (FY2022)

	Japan	Overseas	Total
Scope 1 <sup>1</sup>	484	1,480	1,965
Scope 2 <sup>2</sup>	854	4	858
Total	1,339	1,484	2,823

GHG Emissions (Scope 1 and 2)



1. Both Japan and overseas figures are calculated based on the GHG Protocol, and emission factors are based on the Japanese law "Act on Promotion of Global Warming Countermeasures"  
 2. GHG emissions factors for electric power purchased in Japan are the adjusted emissions factors of electric suppliers  
 For China and Taiwan, the latest emission factors published by the governments of those countries are used  
 For Vietnam, the default emission factor compiled by The Climate Registry (TCR) (2011 national emission factors published by the International Energy Agency (IEA) in 2013) is used

GHG Emissions [P.70](#)

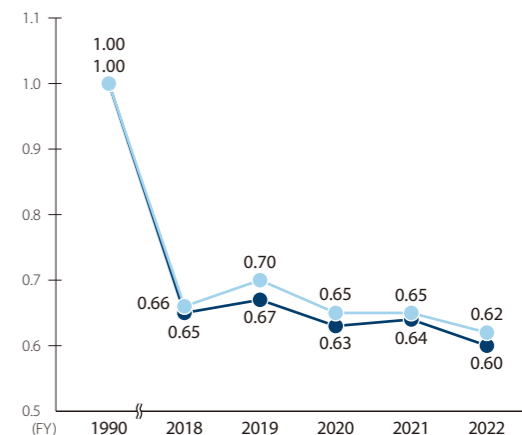
Energy and GHG Emissions Intensity Indices\* (Scope: Smelting & Refining Business in Japan)

GRI 302-3/305-4/305-5

In FY2022, the energy intensity of the Smelting & Refining Business in Japan improved by approximately 5% year on year. This was due to production increases.

SMM is a member of the Japan Mining Industry Association (JMIA), an organization of non-ferrous mining, smelting and refining companies, and we are participating in the Carbon Neutrality Action Plan being led by the Japan Business Federation (Keidanren).

We will continue to proactively engage in thorough energy management, the promotion of energy-saving activities, the introduction of renewable energy, the use of unutilized heat, and other endeavors with the aim of reducing energy intensity by an average of at least 1% per year and further lowering CO<sub>2</sub> emissions over the medium to long term.



\* Energy and GHG emissions intensity indices: the amount of energy consumed and GHGs emitted during the production of 1 ton of product (In the graph on the right, FY1990 is the base year with a value of 1)

— Energy intensity index — GHG emissions intensity index

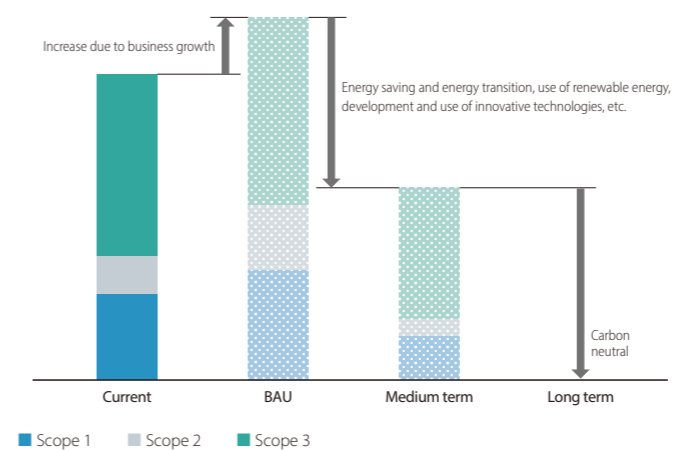
Energy and GHG emissions intensity indices [P.70](#)

SMM Group's Approach to Reducing GHG Emissions

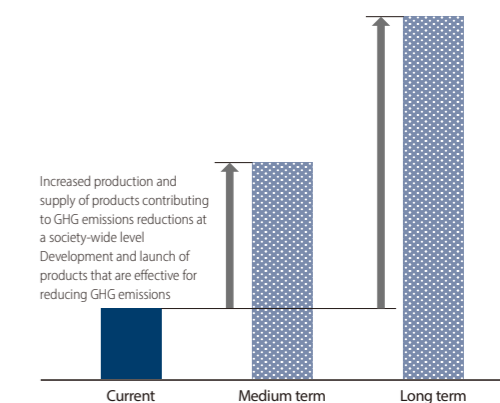
If we continue with our current Group business model (BAU\*), then Scopes 1–3 GHG emission volumes are predicted to rise in accordance with business growth. We will aim to reduce emissions volumes by implementing in-house measures for Scope 1 and 2 emissions, such as energy transition, and by cooperating with suppliers for Scope 3 emissions. Furthermore, we will actively contribute to reducing GHG emissions at a society-wide level through the supply of products contributing to a low-carbon society produced by the Group, including secondary battery cathode materials for automobiles and near-infrared absorbing materials.

\*BAU: business as usual

Visualization of GHG Emissions Reductions



Visualization of Contribution to GHG Emissions Reductions



Climate Change

Main Climate Change Countermeasures

We are working to counter the effects of climate change, primarily through the following four measures.

1 Reduction of GHG Emissions in the Production Process

We are working to reduce GHG emissions generated in the production process through a medium- to long-term approach outlined below.

Energy saving	Energy transition	Utilizing external technologies, businesses, and policies
E.g., Upgrade to highly efficient facilities, improve production processes, introduce AI and IoT	E.g., Transition to LNG, electricity, hydrogen, and biofuels	E.g., New CO <sub>2</sub> -free fuels such as synthetic methane, hydrogen, and ammonia as renewable energy sources Carbon capture, utilization, and storage (CCUS) technology

Using Internal Carbon Pricing

The SMM Group implemented Internal Carbon Pricing (ICP), an action in which companies set an in-house carbon price to promote capital investments for decarbonization and energy savings and consider GHG emission reductions as a capital investment effect. Since introducing an ICP in September 2020, we have moved forward with decarbonization investments that make active use of ICP at business sites. Specifically, in addition to energy-saving investments, such as introducing LED lighting and replacing to highly efficient air conditioning equipment, we are actively taking on various challenges, including those related to solar power and a fuel transition from heavy oil to LNG, which previously could not be undertaken because of poor investment return. We plan on further expanding ICP measures.

Investments subject to ICP <sup>1</sup>	Anticipated CO <sub>2</sub> emissions reduction (t-CO <sub>2</sub> /year) <sup>2</sup>
33	76,755

1. Covers investments for which the application of the system was decided between 2021 and March 2023  
 2. As this includes investments that will be implemented from FY2024 onward, the period in which effects manifest and the period in which application was decided are not concurrent

ICP System Application Examples

Toyo Smelter & Refinery	Transition from heavy oil to LNG as fuel for some heat supply equipment (to be completed in stages from FY2023 to FY2025)
Niihama Nickel Refinery	Transition from heavy oil to LNG as boiler fuel (to be completed in FY2023)
Harima Refinery	Transition to electricity generated from renewable sources for 100% of purchased electricity (underway since FY2022)
Hishikari Mine	Transition to electricity generated from renewable sources for 100% of purchased electricity (underway since 2023)
CBNC	Transition to co-firing by replacing some fuel coal with woody biomass (currently being trialed)

2 Development and Supply of Products that Contribute to a Low-Carbon Society

Products or materials that contribute to reducing GHG emissions at a society-wide level through their production and supply by our Group are positioned as low-carbon products, and their development and supply to the market are actively promoted. In FY2022, they contributed to reducing GHG emissions by 540 kt-CO<sub>2</sub>e.\*

\* Of our products, the combined value that cathode materials for automobile batteries and near-infrared absorbing material (CWO\* (only for automobile glass)) from objectively calculated technical data provided by the public or by customers

3 Realizing a Stable Supply of Non-Ferrous Metal Resources

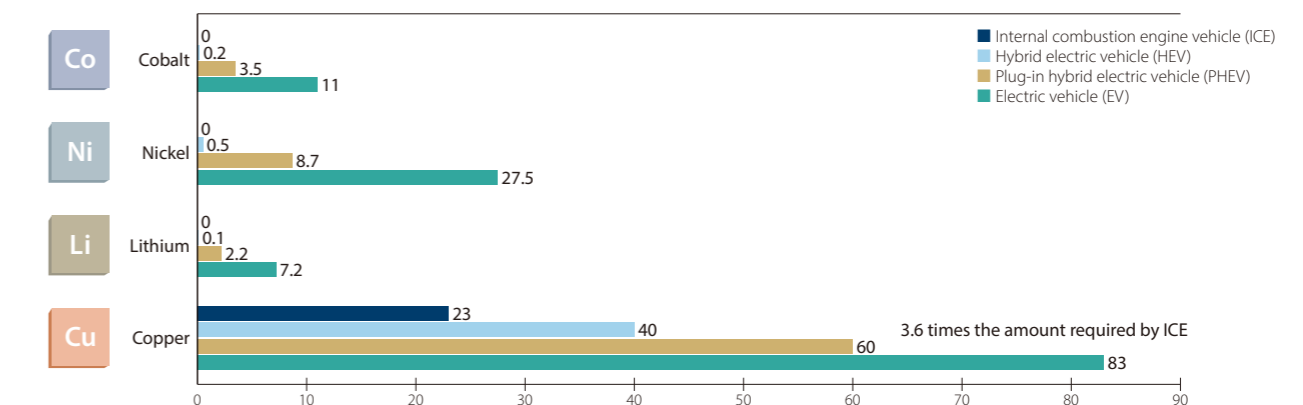
The main mineral resources for renewable energy, which is a major trend in realizing a carbon neutral society, and used in the electrification of EVs and other vehicles are shown in the table below. We provide many of these materials. We are also developing technologies for the efficient recovery of lithium from salt lake water and studying its industrialization.

The exact metal usage per vehicle increases as electrification advances, with copper requiring 3.6 times the weight equivalent of a gasoline-powered vehicle. We believe that meeting the growing demand for such materials is an important role that our Group should fulfill.

	System and Fundamental Technology	Main Metal Resources Required*	
Renewable energy sector	Power generation and batteries	Wind power generation	Copper, aluminum, rare earths
		Solar power generation	Indium, gallium, selenium, copper
		Geothermal power generation	Titanium
		Large-capacity storage batteries	Vanadium, lithium, cobalt, manganese, copper
Automobile sector	Batteries, motors, etc.	Lithium-ion batteries	Lithium, cobalt, nickel, manganese, copper
		Solid-state batteries	Lithium, nickel, manganese, copper
		High-performance magnets	Rare earths
		Fuel cells (electrodes, catalysts)	Platinum, nickel, rare earths (scandium)
		Hydrogen tanks	Titanium, niobium, zinc, magnesium, vanadium

\* Materials in a blue font are produced by the Group

Metal Used per Vehicle (kg)



Source: The Agency for Natural Resources and Energy's Mineral Resources Policy for Achieving Carbon Neutrality in 2050

4 Establishing Innovative Technologies that Support Decarbonization

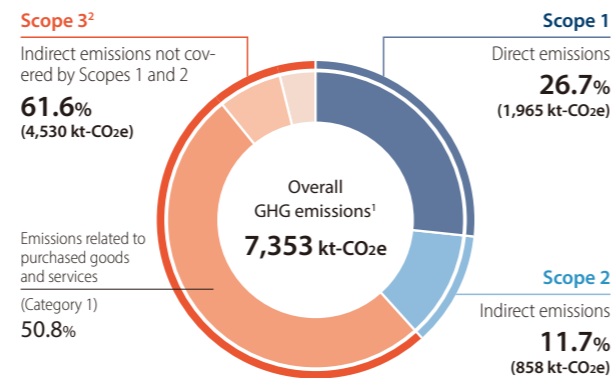
In achieving carbon neutrality for our Group, it is essential to develop innovative technologies that lead to a dramatic reduction in GHG emissions within smelting and refining operations, which account for 90% of our total emissions, and to apply these technologies to our production processes. In copper smelting and refining, we are developing hydrogen reduction technology to reduce coal consumption, and for nickel smelting and refining, we are developing a next-generation process and CO<sub>2</sub> fixation technology. We have our eye on the future as we work in collaboration with multiple universities and companies to proactively pursue next-generation technology.

Climate Change

GHG Emissions in the Value Chain (Scope 3)

GRI 305-3

Scope 3 GHG emissions generated in FY2022 amounted to 4,530 kt-CO<sub>2</sub>e. The percentage of Category 1 emissions out of overall Scope 3 emissions was high, so we will communicate with business partners to make the calculation of Scope 3 emissions volumes more accurate and we will set reduction targets.



1. Scope includes the entire SMM Group (however, data for Category 5 to 7 only covers Group companies in Japan)  
 2. Excludes Categories 8–12, 14, and 15

Scope 3 Emissions and Percentage of Overall Emissions

Category	Emissions (kt-CO <sub>2</sub> e)	Percentage	Calculation Method
<b>Total Scope 3 Emissions</b>	<b>4,530</b>	<b>61.6%</b>	
1. Purchased goods and services <input checked="" type="checkbox"/>	3,737	50.8%	$\Sigma$ (weight of key raw materials x emissions intensity) <sup>1</sup>
2. Capital goods <input checked="" type="checkbox"/>	518	7.0%	$\Sigma$ (amount of capital expenditures x emissions intensity x 1.05) <sup>2</sup> Capital expenditures include construction in progress, used equipment, and intragroup transactions
3. Fuel- and energy-related activities not included in Scope 1 or Scope 2 <input checked="" type="checkbox"/>	239	3.3%	$\Sigma$ (electricity and fuel consumptions x emissions intensity [electricity, <sup>2</sup> fuel!])
4. Upstream transportation and distribution <input checked="" type="checkbox"/>	26	0.3%	Emissions from domestic transportation are calculated based on the Japanese laws the "Act on Rationalizing Energy Use" and "Act on Promotion of Global Warming Countermeasures."
5. Waste generated in operations	7	0.1%	$\Sigma$ (amount of waste by type (major sites in Japan) x emissions intensity by waste type) <sup>2</sup>
6. Business travel	1	0.0%	$\Sigma$ (number of employees (major sites in Japan) x emissions intensity) <sup>1</sup>
7. Employee commuting	3	0.0%	$\Sigma$ (number of employees (major sites in Japan) x number of business days x emissions intensity) <sup>2</sup>
8. Upstream leased assets	Not applicable <sup>3</sup>		
9. Downstream transportation and distribution	Not applicable <sup>4</sup>		
10. Processing of sold products	Not applicable <sup>4</sup>		
11. Use of sold products	Not applicable <sup>4</sup>		
12. End-of-life treatment of sold products	Not applicable <sup>4</sup>		
13. Downstream leased assets	0.2	0.0%	$\Sigma$ (electricity and gas consumption by tenants of the Head Office building x emissions intensity) <sup>5</sup>
14. Franchises	Not applicable <sup>6</sup>		
15. Investments	Not applicable <sup>7</sup>		

Scope includes the entire SMM Group (however, data for Category 5 to 7 only covers Group companies in Japan)

1. For emissions intensity, we used values from the National Institute of Advanced Industrial Science and Technology's IDEA Ver. 3.3

2. For emissions intensity, we used values from the Database for Calculating GHG Emissions of the Supply Chain, Ver. 3.3, prepared by the Ministry of Environment and the Ministry of Economy, Trade and Industry in Japan

3. Not applicable as it is included in calculations of Scope 1 and 2 emissions

4. This category is not applicable because it is difficult to calculate emissions since our products are mainly non-ferrous metals and highly advanced materials, which have diverse applications after sales destinations, and each application has different GHG emission characteristics

5. Emissions intensity was calculated based on the list of calculation methods and emission factors of the Ministry of the Environment's Greenhouse Gas Emissions Calculations Reporting and Publication System

6. Not applicable as we do not operate any franchise businesses

7. Not applicable as it is the disclosure of information on investments for profit



# Significant Environmental Accidents / Biodiversity

## Vision for 2030

**A company that values water resources and biodiversity, and protects the richness of the sea and land**

### Approach and Policy

GRI 3-3

Significant environmental accidents have major impacts on the environment and communities, and can result in loss of the trust that is a prerequisite for business continuity. In particular, the SMM Group's business activities have the potential to cause environmental pollution through such means as the leakage of mining waste and chemicals. By improving our facilities and management to address such risks as well as intensifying natural disasters, we are working to prevent significant environmental accidents and mitigate impacts in the event of occurrence.

We are also working to sustainably utilize and manage water resources and to reduce our emissions of harmful substances into the atmosphere and water, and are developing environmental conservation activities that place importance on biodiversity.

In FY2022, there were no significant environmental accidents which would have a serious impact on the environment or society.

## Promotion Structure

GRI 3-3

Matters concerning significant environmental accidents as well as biodiversity are primarily advanced by the Environmental Preservation Subcommittee\* and the Safety & Environment Control Department.

\* Environmental Preservation Subcommittee P.40

## Medium-Term Targets and Progress

GRI 3-3/303-1

To achieve our Vision for 2030, we are managing progress for each KPI and have made achievement criteria and action plans for up to 2030.

FY2022 Results	FY2023 Plan	Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 1. Zero significant environmental accidents</b> <b>1) Promote improvements through the use of risk management and environmental management systems</b>			
<ul style="list-style-type: none"> <li>No significant environmental accidents or violations occurred due to implementation of management improvements using a risk management system (RMS) and an environmental management system (EMS)</li> </ul>	<ul style="list-style-type: none"> <li>Establish targets to strengthen our ability to address environmental conservation using our RMS and EMS at all sites, and implement PCDA cycles while continuing initiatives in line with our plan</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Maintain zero significant environmental accidents</li> <li>Maintain zero significant violations</li> <li>Eliminate significant environmental compliance violations</li> </ul>	<b>Action Plan</b> <ul style="list-style-type: none"> <li>Strengthen management based on risk registration / management as significant environmental aspects                             <ul style="list-style-type: none"> <li>Strengthen communication with site managers, including patrols</li> <li>Provide education and support for improving competence of environmental staff</li> <li>Invest in improving treatment of wastewater and exhaust gas</li> </ul> </li> <li>Strengthen management based on risk registration / management as significant environmental aspects                             <ul style="list-style-type: none"> <li>Respond to tighter laws and regulations</li> <li>Invest in improving treatment of wastewater and exhaust gas and promote investment in remote, automation and other cutting-edge technology (DX)</li> </ul> </li> </ul>

FY2022 Results	FY2023 Plan	Final Year of 2021 3-Year Business Plan (FY2024)	Final Year of 2027 3-Year Business Plan (FY2030)
<b>KPI 1. Zero significant environmental accidents</b> <b>2) Reinforce and improve equipment and infrastructure to address increases in sources of natural hazard</b>			
<ul style="list-style-type: none"> <li>Implemented risk assessment using the World Wide Fund for Nature (WWF) Water Risk Filter</li> <li>Identified risks at each site, and considered countermeasures</li> </ul>	<ul style="list-style-type: none"> <li>Continue to implement risk assessment using the WWF Water Risk Filter</li> <li>Continue to identify risks at each site, and consider countermeasures</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Based on results of climate change scenario analysis review, identify risks, consider and implement countermeasures</li> <li>Establish standards and guidelines for responding to increasingly severe rainstorms and promote improvements and enhancements</li> <li>Revise BCPs</li> </ul>	<ul style="list-style-type: none"> <li>Based on results of climate change scenario analysis review, identify risks, consider and implement countermeasures</li> <li>Establish standards and guidelines for responding to increasingly severe rainstorms and promote improvements and enhancements</li> <li>Revise BCPs</li> </ul>
		<b>Action Plan</b> <ul style="list-style-type: none"> <li>Implement risk assessment using the WWF Water Risk Filter and countermeasures for each site based on the results</li> <li>Link with activities of the Carbon Neutrality Committee</li> </ul>	<ul style="list-style-type: none"> <li>Implement risk assessment using the WWF Water Risk Filter and countermeasures for each site based on the results</li> <li>Link with activities of the Carbon Neutrality Committee</li> </ul>
<b>KPI 2. Reduce emissions of hazardous substances (year-on-year)</b> <b>1) Optimize water use; reduce emissions of hazardous substances to the atmosphere and water</b>			
<ul style="list-style-type: none"> <li>Further improved emissions of hazardous substances at each site</li> <li>Considered a draft water policy for the Sumitomo Metal Mining Group</li> </ul>	<ul style="list-style-type: none"> <li>Systematically continue to address targets for emissions of hazardous substances at each site</li> <li>Establish the water policy (June 1, 2023)</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Reduce transfers and emissions of hazardous substances through continuous improvements</li> <li>Publish water policy and implement initiatives</li> </ul>	<ul style="list-style-type: none"> <li>Reduce transfers and emissions of hazardous substances through continuous improvements</li> <li>Implement initiatives on water and disclose information</li> </ul>
		<b>Action Plan</b> <ul style="list-style-type: none"> <li>Promote improvements and enhancements based on risks</li> <li>Analyze PRTR data and provide feedback to sites and support based on results</li> <li>Consider and formulate water policy</li> </ul>	<ul style="list-style-type: none"> <li>Promote improvements and enhancements based on risks</li> <li>Continue to promote action based on PRTR data improvement and results</li> <li>Promote water policy and initiatives</li> </ul>
<b>KPI 2. Reduce emissions of hazardous substances (year-on-year)</b> <b>2) Promote various environmental preservation and biodiversity preservation activities, such as regular reforestation</b>			
<ul style="list-style-type: none"> <li>Continued regular reforestation CBNC: 38 ha THPAL: 59 ha</li> <li>Identified trends in Japan and overseas on disclosure of biodiversity information</li> </ul>	<ul style="list-style-type: none"> <li>Continue regular reforestation</li> <li>Consider formulation of biodiversity policy</li> </ul>	<b>Achievement Criteria</b> <ul style="list-style-type: none"> <li>Continue regular reforestation</li> <li>Formulate initiatives and policy on preserving biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>Continue and review regular reforestation</li> <li>Continue to improve initiatives on preserving biodiversity</li> </ul>
		<b>Action Plan</b> <ul style="list-style-type: none"> <li>Promote reforestation by CBNC and THPAL and continue communication with mining companies through the two companies</li> <li>Examine and analyze nature-related risks and opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Promote reforestation by CBNC and THPAL and continue communication with mining companies through the two companies</li> <li>Continue to promote measures to counter nature-related risks</li> </ul>

## Chemical Substance Management

Because chemicals are frequently handled in the SMM Group, we have established a chemical substance management system within the environmental management system (EMS) at all business sites under divisional jurisdiction. For example, when a business site intends to handle a new chemical, it conducts a preliminary study that covers hazard statements, laws and regulations, and other applicable information, and deliberates in a meeting at the business site before deciding whether to adopt the handling of said chemical. In addition, the business divisions and Safety & Environment Control Department cooperate with requests for preliminary consultation and verification from the business site.

Further, we also provide information on safe handling for all chemicals transferred or provided to customers or other business sites in the SMM Group using safety data sheets (SDS)<sup>1</sup> which conform to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS),<sup>2</sup> regardless of whether or not we are legally obligated to do so.

When developing new materials, we strive to develop materials that customers can use safely and with peace of mind. We review development themes taking into account the toxicity of contained substances, including as pertains to domestic and international regulations for final products as well as the environmental impact of production processes.

Products for export to the EU are also subject to the RoHS Directive and the REACH Regulation,<sup>3</sup> enacted with the aim of protecting human health and the environment, and we address these accordingly.

1. Safety data sheet (SDS): A document listing information on a chemical, including the chemical substance, the product name, the supplier, hazards, safety precautions and emergency procedures  
 2. The Globally Harmonized System of Classification and Labeling of Chemicals (GHS): A system for classifying chemicals based on the type and degree of hazards and toxicity they pose, chemical labeling, and safety data sheet provision in accordance with a set of internationally-agreed upon rules  
 3. REACH Regulation: The Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. An EU regulation concerning the registration, evaluation, approval, and limiting of chemical substances

Significant Environmental Accidents / Biodiversity

**Sumitomo Metal Mining Group's Water Policy**

**1 Context**

Sumitomo Metal Mining ("SMM") Vision for 2030 has been formulated as a milestone for the realization of our long-term vision of Becoming the World Leader in the Non-Ferrous Metals Industry. In our "Vision for 2030", we believe it is important to be a company that protects oceans and land with consideration for water resources and biodiversity. The SMM Group requires large amounts of water in its production processes, mainly in its mining and metals operations, and water is an indispensable resource for its business activities. At the same time, water is an essential shared resource for local communities and the surrounding ecosystem. To achieve our vision, we set goals to optimize water use and reduce emissions of hazardous substances to water.

This Water Policy guides our commitment for sustainable use and management of water resources across all our operations.

**2 Scope**

This policy applies to the entirety of SMM's business (SMM and its subsidiaries), unless any aspect of the Policy is not permitted by local law or regulations.

**3 Governance & Promotion framework**

The Environmental Preservation Subcommittee, a subcommittee of the Sustainability Committee chaired by the President, will report regularly to the Sustainability Committee, which is overseen by the Board of Directors, on the status of compliance with this policy and promote water-related initiatives.

**4 Water Policy Principles**

As an ICMM (International Council on Mining and Metals) member, we aligned this Policy with ICMM member's approach outlined in the ICMM position statement on water stewardship. SMM has adopted the following principles with respect to water issues and risk management.

- SMM will align its business strategy with identified risk and opportunities.
- SMM will monitor and report on our efforts and results.
- SMM will engage with key stakeholders.

**5 Business Strategy & Operations**

Water is essential to our business. It is vital we drive responsible water use across our operations, minimize our environmental impact on water resources and invest in projects and technology for water management.

- We will consider water impacts and integrate water management into our business strategy and operational decisions.
- We will identify and proactively manage water related risk and opportunities including those associated with water quality, water scarcity.
- We will support and implement water stewardship initiatives and projects that promote better water use, reduce freshwater use, have effective catchment management and contribute to improved water security and sanitation. We will ensure provision and access to clean and safe drinking water and sanitation facilities at all our sites.
- We will develop and invest in technology and innovation for effective water management.

**6 Monitoring and Reporting**

We are committed to disclosing our water performance and progress towards our targets so that stakeholders can be informed and actively involved in our sustainability journey.

- We will set and regularly review water management objectives and set context-based water targets.
- We will proactively monitor our water performance and collect water consumption data.
- We will publicly report on our water management performance, material risks and provide updates on progress against our targets using consistent industry metrics and recognized approaches.

**7 Engagement**

Access to water is critical to the communities in where we operate. While we recognize and continue to focus on the positive impacts that our management system can facilitate, the risks associated with broader social and economic water-related impacts in the region.

We recognize the importance of working with our stakeholders to promote effective water governance and stewardship. We will support collective action to improve water policies, regulations and address shared water challenges in communities and value chains.

- We will advocate for responsible water usage practices and increase water stewardship awareness with our key stakeholders, including employees, suppliers and customers.
- We will educate all officers and employees of the Group on understanding this policy and water-related initiatives.
- We will engage with communities and stakeholders who may be affected by a site's water use and wastewater discharge to address shared water management issues.
- We will establish and maintain a grievance mechanism that is accessible to our stakeholders.
- We will engage with governments and local authorities in the areas in where we operate on water-related public policy and regulation.

**8 Review**

This water policy will be reviewed periodically by the Chairman of the Environmental Preservation Subcommittee and, if necessary, changes will be approved by the Board of Directors.

Akira Nozaki  
President and Representative Director  
June 1, 2023



Significant Environmental Accidents / Biodiversity

Water Risk Management

GRI 303-1

Water is a shared resource of local regions and is closely connected to the lives of local residents and communities, as well as to the surrounding ecosystem. In addition to identifying water risks using WWF Water Risk Filter and then reducing those risks, our Group gives consideration to local communities and the environment in areas where we use water and are working with a sense of responsibility to make good use of the limited water resources.

Example Initiatives

- Prevention of excessive water withdrawal by understanding the amounts of withdrawal by source
- Reduction of water withdrawal and discharge amounts by promoting the use of recycled and reused water
- Promotion of effective use of water by understanding water balance and optimizing our amounts used
- Reduction of environmental impact by reducing amounts of hazardous chemical substances in effluent discharged into water
- Promotion of preservation of biodiversity through aquatic life monitoring surveys near our business sites
- Promotion of infrastructure development in areas where access to water is difficult

At Coral Bay Nickel Corporation (CBNC) in Palawan Island, the Philippines makes effective use of water resources because the area is prone to water shortages during the dry season. For example, they treat supernatant water that accumulates in tailings dams at recycling facilities and then reuse the water in their smelting and refining processes. The company also supplies this water as industrial water to lime slurry producers, who are suppliers for the company. Furthermore, CBNC provides, maintains, and manages water supply equipment and delivers drinking water using tanker trucks as necessary as part of its water-related contributions to local communities. In addition, a team that consists of members from the Environmental Management Office (EMO), the department that conducts environmental management activities for the company, local governments, NGOs, and other entities, strives to reduce the environmental effects of discharge by conducting regular water quality tests to determine if plant operation is having a major impact on water in the surrounding area.

The SMM Group also completes an annual CDP's water security questionnaire regarding its water management. Further, on June 1, 2023, we established the Sumitomo Metal Mining Group's Water Policy to summarize and clarify our approach to water.

Managing Tailings Dams

GRI 306-1/306-2/G4-MM3

Tailings facilities in which tailings from mines are dumped may collapse and cause considerable damage.

In August 2020, Global Tailings Review (GTR) formulated the Global Industry Standard on Tailings Management (GISTM). The International Council on Mining and Metals (ICMM)\* is committed to compliance with GISTM, and as a member of ICMM, we are conducting investigations to comply with the standard.

Our Group thoroughly implements measures to prevent significant environmental accident at closed mines that it manages and tailings dams managed by CBNC and Taganito HPAL Nickel Corporation (THPAL), both of which are located in the Philippines.

Based on the GISTM, in August 2022, we disclosed on our website tailings dams with a risk classification of "Very High" or higher (one managed by CBNC and one managed by THPAL). [P.64-68](#)

\* ICMM [P.130](#)

Managing Decommissioned and Closed Mines

GRI 306-1/306-2

The SMM Group appropriately manages the top soil, waste rock, tailings, sludge, and other mining waste generated in accordance with our resource business. Rock (waste rock) containing sulfide ores, in particular, can easily result in the production of water that contains heavy metal ions as well as acidic water due to sulfate ions from oxidation, and accordingly we appropriately treat effluent at a water treatment facility prior to discharging it.

As shown in the map of closed mines managed by SMM, we operate 42 slag storage facilities in Japan.

Legal standards regarding the stability of storage facilities were revised after the Great East Japan Earthquake in 2011. After assessments were conducted based on these revised standards, 11 sites were found to be insufficient, and by 2018 we had finished construction to strengthen these sites, investing a cumulative total of approximately ¥4.5 billion.

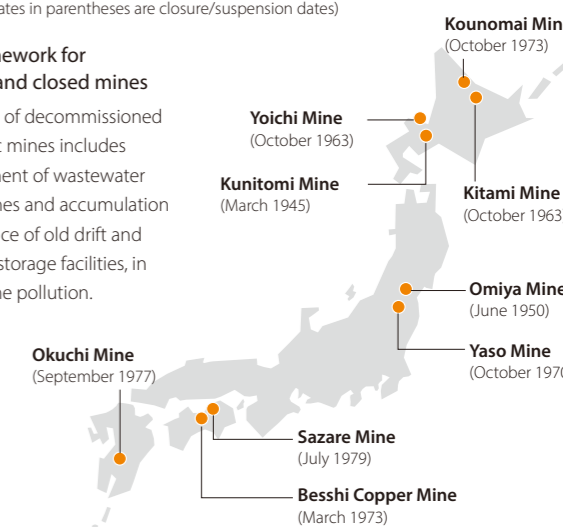
Tailings and other mining waste generated by mines accumulate at storage facilities. The breach of an accumulation site could potentially cause significant damage. Accordingly, going forward, we will continue to soundly manage closed mines while also engaging in facility and infrastructure strengthening and improvement.

Decommissioned and Closed Domestic Mines

(as of July 1, 2023, dates in parentheses are closure/suspension dates)

Management framework for decommissioned and closed mines

SMM's management of decommissioned and closed domestic mines includes daily, 24-hour treatment of wastewater discharged from mines and accumulation sites, and maintenance of old drift and slag and waste rock storage facilities, in order to prevent mine pollution.



Rehabilitating Tailings Dams

GRI 306-1/306-2

CBNC and THPAL produce intermediates for electrolytic nickel and nickel sulfate. At tailings dams, the slurry after the recovery of nickel through the production process is treated through neutralization to eliminate toxins and precipitate heavy metals. The treated slurry is then pumped to the tailings dam where it allows the solids to settle down.

When the storage capacity of the tailings dams is reached, the site is rehabilitated in order to establish an independent and sustainable ecosystem. Rehabilitation does not simply mean greening, but also making it possible for the area to return into its original state which is conducive to sustaining a natural ecosystem. This involves agroforest technology wherein the forest is established alongside agricultural farming. Thus, vegetables and fruits are also grown in the area. Many local residents and indigenous people are involved in this work, and rehabilitation plays an important role in creating local employment.

Rehabilitated area [P.73](#)

Details on business activities in areas of high biodiversity value [P.73](#)

Reducing the Environmental Impact of Constructing New Plants

To construct a refinery in the Philippines, we first had to obtain an Environmental Compliance Certificate (ECC) from the Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB), and we submitted an Environmental Impact Assessment (EIA).

When constructing the refinery, we sought adequate dialogue with the Philippine government, local authorities and local citizens right from the planning stage. Efforts were made to construct a plant that would have a minimal impact on the environment. For example, the pier used to deliver sulfuric acid and methanol to the plant was made to circle around the coral reef, and wastewater outlets were also positioned to ensure the reef's protection.

CBNC began the operation of the refinery in April 2005 based on a design certified by the DENR-EMB, and was followed by THPAL in October 2013. The refineries have set up Environmental Management Offices (EMO) that are primarily responsible in promoting environmental initiatives of the operations. Besides environmental surveys by the EMO, the environment is monitored by a team of representatives from organizations such as the DENR, local authorities and NGOs which carry out regular sampling of the air, water, flora and fauna. With this sort of environmental monitoring, we check that the construction and operation of plants do not have serious impacts on the ecosystem, while keeping environmental impacts from wastewater and other factors to a minimum.

Through our efforts in this area, CBNC and THPAL have been awarded the Philippines DENR-EMB's Presidential Mineral Industry Environmental Award (PMIEA) eight times and two times, respectively between 2014 and 2022.



Significant Environmental Accidents / Biodiversity

Environmental Impact of Business Activities (material flow)

INPUT (resources & energy)

GRI 301-1/301-2/302-1/303-3/303-5

 **Raw Material Input 12,840 kt** ✓

Percentage of Recycled Input Raw Materials Used 2.21%

Raw Materials	Total	10,424 kt
Gold and silver ore		202 kt
Copper concentrates		1,493 kt
Nickel oxide ore		8,418 kt
Nickel matte, etc.		37 kt
Raw material for batteries		85 kt
ALC raw material, incl. silica rock		150 kt
Hydrotreating catalyst raw material		39 kt
Recycled Materials <sup>1</sup>	Total	236 kt
Copper scrap		122 kt
Secondary zinc		11 kt
Precious metals and other secondary materials		5 kt
Electric arc furnace dust		97 kt
ALC waste		848 t
Materials	Total	2,180 kt
Silica sand (for copper smelting)		115 kt
Chemicals (lime-based)		1,313 kt
Chemicals (sodium-based)		102 kt
Chemicals (magnesium-based)		15 kt
Sulfuric acid		545 kt
Cement, etc.		91 kt

 **Energy Input<sup>2</sup> 22,762 TJ** ✓

Total Energy Consumption	Energy Value	Consumption
Non-Renewable Energy Sources	Total	22,696 TJ
Heavy oil	1,783 TJ	44,516 kL
Coal/coke	13,778 TJ	533,553 t
Diesel/gasoline/kerosene	997 TJ	26,529 kL
LPG/LNG	414 TJ	8,143 t
City gas/natural gas	605 TJ	13,477 ML
Purchased electricity	5,120 TJ	1,422,101 MWh
Purchased steam <sup>3</sup>	0 TJ	75 GJ
Renewable Energy	Total	66 TJ
Solar power generation, binary power generation	1 TJ	295 MWh
Biomass steam	65 TJ	63,544 GJ

 **Water Withdrawal<sup>4</sup> 197,186 ML**

Total Water Consumption from All Areas<sup>5</sup> 3,552 ML

Freshwater Withdrawal	Total	37,686 ML
Surface water (rivers)		15,321 ML
Rainwater		44 ML
Groundwater		7,586 ML
Industrial water (water from another organization)		14,346 ML
Tap water (water from another organization)		391 ML
Seawater Withdrawal	Total	159,500 ML



OUTPUT (products & emissions)

GRI 303-4/305-1/305-2/305-7/306-1/306-2/306-3/G4-MM3

 **Products 2,676 kt** ✓

Percentage of Products from Recycled Input 7.42%

Electrolytic copper	447 kt
Gold	18 t
Silver	228 t
Electrolytic nickel	53 kt
Nickel sulfate	12 kt
Electrolytic cobalt	4 kt
Crude zinc oxide	43 kt
Chromite <sup>1</sup>	69 kt
Ferronickel	52 kt
Battery materials	61 kt
Sulfuric acid	312 kt
Slag	1,417 kt
Hydrotreating catalysts	10 kt
ALC (Siporex)	303 ML

 **Emissions**

Emissions into the Atmosphere

GHG	Total	2,823 kt
Scope 1 (direct emissions) <sup>2</sup>		1,965 kt
Scope 2 (indirect emissions) <sup>3</sup>		858 kt
SOx		1,715 t
NOx		1,512 t
Soot and dust		68 t

Discharge into Water 132 t ✓

COD	49 t
BOD	16 t
Total phosphorus	1 t
Total nitrogen	66 t

Release of Chemical Substances (PRTR substances) 84 t ✓

Atmosphere	8 t
Public water areas	75 t
Soil/landfills on business premises	1 t

Total Water Discharge 196,736 ML ✓

Discharges into seas <sup>4</sup>	195,792 ML
Discharges into rivers	879 ML
Sewerage, etc.	65 ML

Waste<sup>5,6</sup>, Total waste 6,946 kt ✓

Of which, 6,846 kt is landfill on company premises and 2,438 t is PRTR substance transfers<sup>7</sup>

Spoil	6 kt
Leach sludge from CBNC, THPAL, etc.	6,840 kt
Industrial waste (Japan)	99 kt
Recycling	23 kt
Other	1 kt

Raw material and energy inputs in business activities [P.71](#)

Water resource input, water discharge, and water consumption in business activities [P.71](#)

Figures are rounded to the nearest whole number, so totals may not match

- Does not include materials recycled within plants
- Fuel, heat, electricity, etc. consumed in business activities in Japan and overseas are covered, and electricity consumption is converted into joules at 3.6 GJ per 1,000 kWh
- Purchased steam includes purchased cold water
- SMM uses the WWF Water Risk Filter to identify and assess regions with high water stress and has determined there are no areas of high water stress at SMM Group's production sites
- Water consumption is estimated by subtracting the total water discharge from the total water withdrawal for each business site. There was no water storage which would have a significant water-related impact

Release and transfer of chemical substances in business activities [P.72](#)

- The percentage of products from recycled input increased because chromite was added to products in FY2021
- Both Japan and overseas figures are calculated based on the GHG Protocol, and emission factors are based on the Japanese law "Act on Promotion of Global Warming Countermeasures"
- GHG emissions factors for electric power purchased in Japan are the adjusted emissions factors of electric suppliers. For China and Taiwan, the latest emission factors published by the governments of those countries are used. For Vietnam, the default emission factor compiled by The Climate Registry (TCR) (2011 national emission factors published by the International Energy Agency (IEA) in 2013) is used
- Discharges into rivers flowing into enclosed seas are included as "discharges into seas"
- Waste includes items of value
- Industrial waste treatment is commissioned to Group companies and industrial waste is recycled for use as raw material. Accordingly, waste figures include some waste which was effectively not discharged outside the Group, in particular (hazardous) sludge
- Total transfers to sewerage and off-site transfers

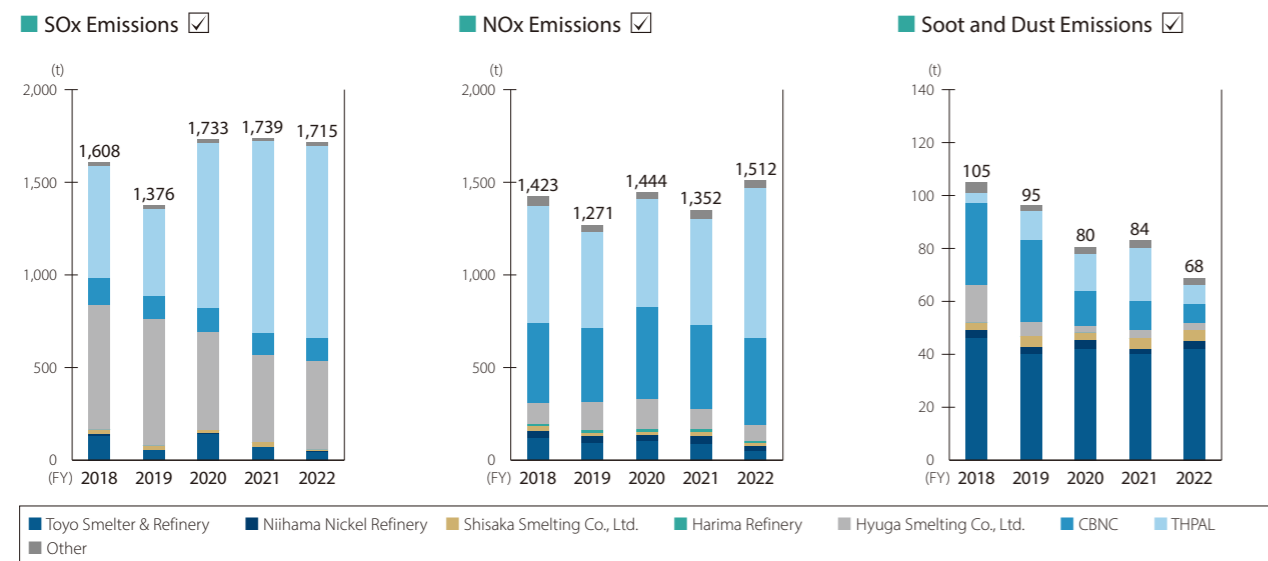
Significant Environmental Accidents / Biodiversity

Emissions into the Atmosphere\*

GRI 305-7

SOx emissions in FY2022 remained flat, decreasing by about 1% year on year. NOx emissions increased by about 12% year on year. Due to the effect of fuel specifications, THPAL's emissions increased by about 240 tons. Soot and dust emissions increased by about 18% year on year.

\* Each emissions figure was calculated based on the measurement of flue gas



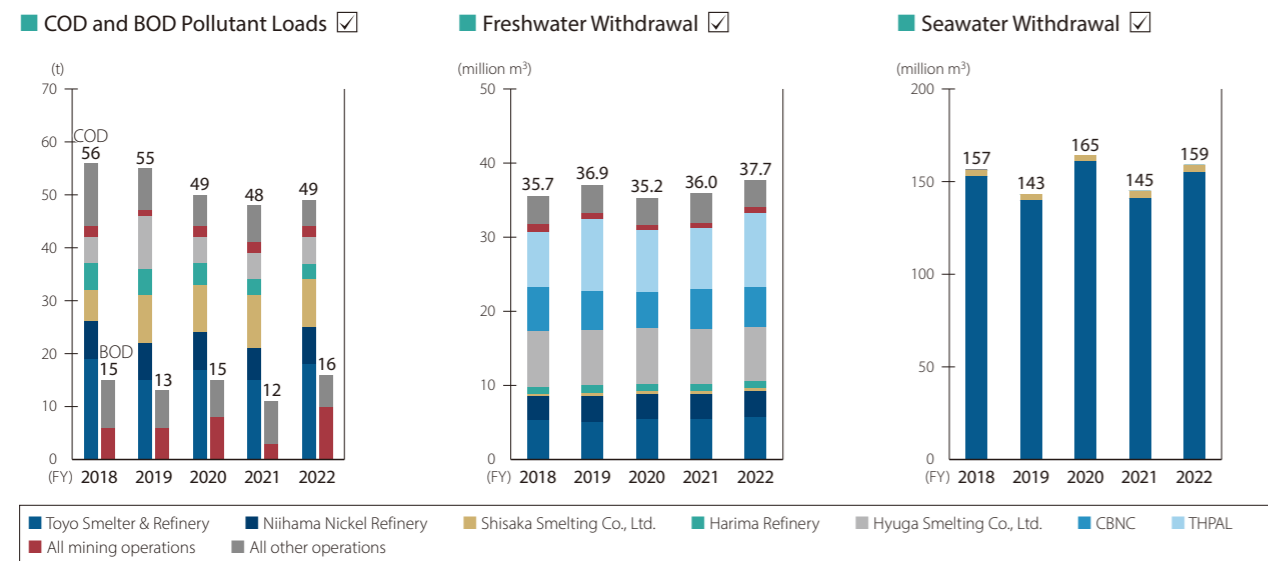
Discharge into Water

GRI 303-2/303-3/303-4

The COD<sup>1</sup> pollutant load in FY2022 increased by about 3% year on year. The BOD<sup>2</sup> pollutant load increased by about 35% year on year due to a small rise in the analysis values at Hishikari Mine as well as an increase in discharge. Many SMM Group business sites face onto Japan's Seto Inland Sea and are subject to controls on the total amounts of COD, nitrogen, and phosphorous emissions under the Act on Special Measures Concerning Conservation of the Environment of the Seto Inland Sea. In addition, we adhere to the discharge standards of the Water Pollution Prevention Act and have not had any violations in this area.

The volume of freshwater usage increased by about 5% year on year to about 37.7 million m<sup>3</sup>. In this calculation, diversion water,<sup>3</sup> which is unrelated to production, is excluded from withdrawal and discharge at mines. The volume of seawater usage increased by about 10% year on year. This was attributable to an increase in production volumes at the Toyo Smelter & Refinery.

- 1. COD (Chemical Oxygen Demand): Measured for discharge into seas, including emissions into rivers flowing into enclosed seas
- 2. BOD (Biochemical Oxygen Demand): Measured for discharge into rivers, excluding emissions flowing into enclosed seas
- 3. Diversion water: Water that flows into the site as an input and flows out of the site as an output without being used for production purposes



Release Control for Chemical Substances<sup>1</sup>

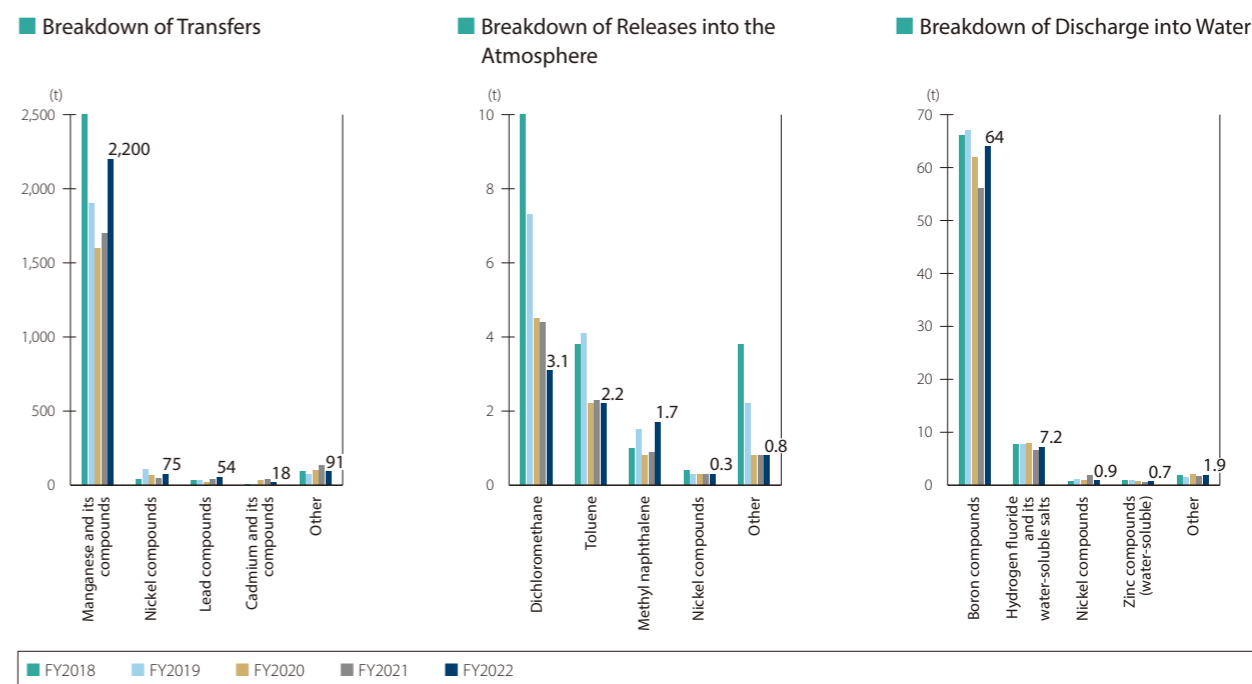
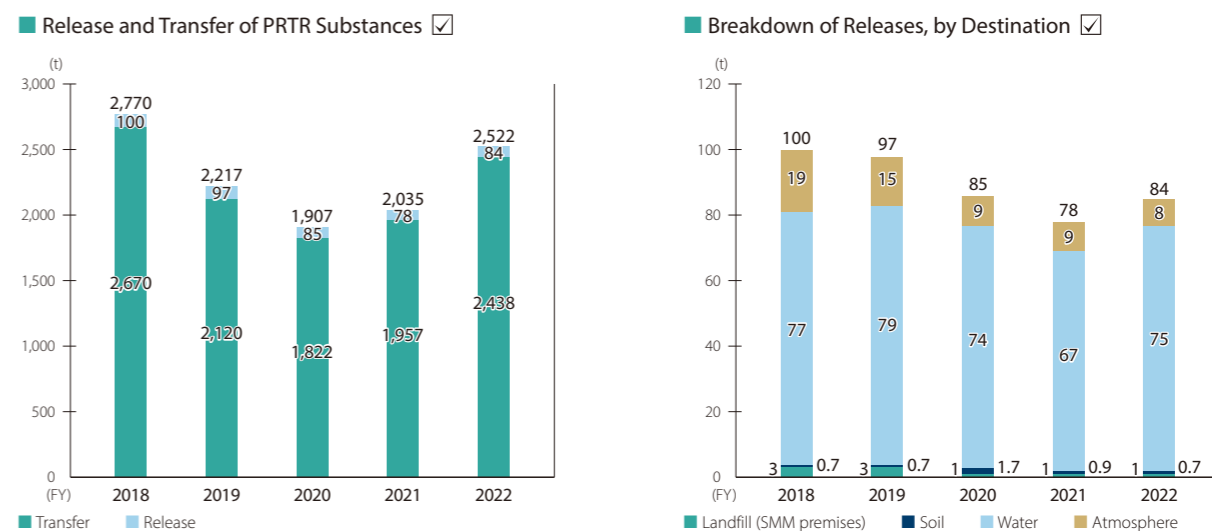
GRI 305-6

An overview of releases and transfers of chemical substances based on Japan's Pollutant Release and Transfer Register (PRTR) system in FY2022 is as follows. The number of data-submitting sites in the SMM Group was 26 (24 in FY2021). The Group had 40 (42 in FY2021) substances requiring registration.

The total released and transferred amount (releases + transfers) came to 2,522 t, an increase of about 24% year on year, mainly due to an increase in transfers. The increase in transfers was due to an increase in the volume of iron clinker<sup>2</sup> to undergo final disposal as industrial waste after being generated as a by-product at Shisaka Smelting Co., Ltd. and a reduction in the volume of manganese transferred off-site.

The amount released into the atmosphere decreased by about 7%. There were no releases of ozone-depleting substances. Discharges into water increased by about 12% year on year.

- 1. Industrial waste treatment is commissioned to Group companies and industrial waste is recycled for use as raw material. Accordingly, chemical substances transferred off-site include some substances which were effectively not discharged outside the Group, such as nickel compounds as well as cobalt and cobalt compounds
- 2. Iron clinker: The residue remaining during the processing of electric arc furnace dust after recovering zinc. The residue able to be sold is called "iron contained pellet," and the residue to be disposed of is called "iron clinker"



Displayed PRTR substances are those with the highest amounts in FY2022

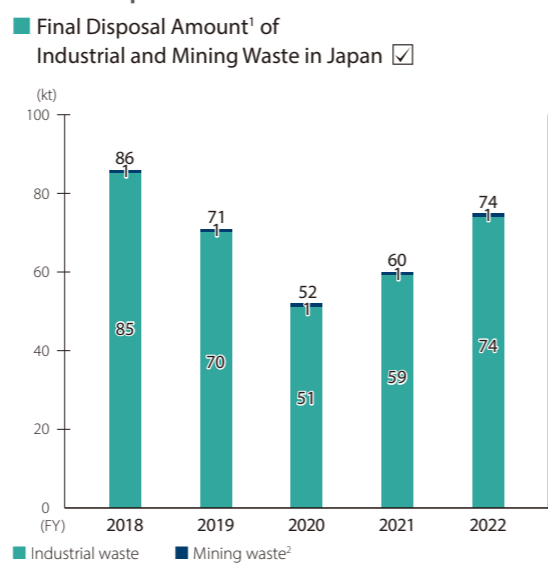
Significant Environmental Accidents / Biodiversity

Trends in Final Disposal Amount of Industrial and Mining Waste in Japan

GRI 306-5

The SMM Group has long been making efforts to reduce industrial waste in Japan and the amount of wastewater sludge (mining waste) that undergoes final disposal from the mine-affiliated Toyo Smelter & Refinery. The total final disposal amount in FY2022 was 74 kt, which was an increase of about 14 kt from FY2021. The main factor behind this increase was an increase in the final disposal volume of iron clinker at Shisaka Smelting Co., Ltd.

Final disposal amount of industrial and mining waste in Japan P.72



1. Includes waste destined for landfills and incineration without heat recovery  
 2. Mining waste in the form of wastewater sludge generated by mine-affiliated Toyo Smelter & Refinery that is landfilled within the business site

Waste by Type and Treatment Method (FY2022)

GRI 306-3/306-4/306-5

Waste by Treatment Method (hazardous/non-hazardous)

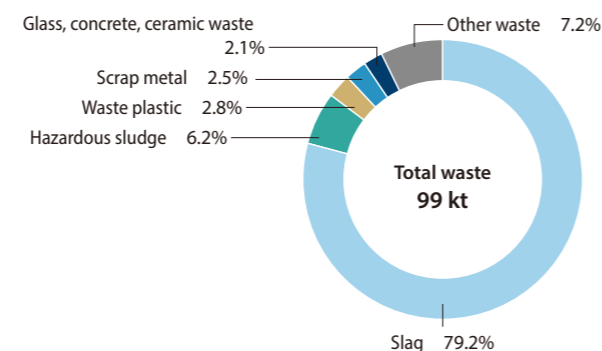
Treatment method	Hazardous	Non-hazardous	Total
Recycling	6.9	17.4	24.3
Incineration (with heat recovery) <sup>4</sup>	0.3	1.0	1.3
Incineration (without heat recovery) <sup>4</sup>	0.0	0.3	0.3
Landfill	70.7	6,847.0	6,917.6
Volume reduction, etc.	1.4	0.9	2.3
<b>Total</b>	<b>79.3</b>	<b>6,866.7</b>	<b>6,945.9</b>

Landfill on company premises / Contracted disposal	Amount (kt)
Landfill on company premises	6,846
Contracted disposal	100

Industrial waste treatment is commissioned to Group companies and industrial waste is recycled for use as raw material. Accordingly, waste figures include some waste which was effectively not discharged outside the Group, in particular (hazardous) sludge

1. In general, this depends upon definitions of the regulations in the other releasing countries concerned. Since Japan does not have such laws or regulations, SMM applies the following definition: "Specially controlled industrial waste and waste delivered to controlled landfill sites (excluding designated inert waste (5 categories of inert waste) that should have been delivered to landfill sites for inert industrial waste, but was disposed of at controlled landfill sites due to the distance limitation)"  
 2. Waste other than hazardous waste  
 3. Treatment methods outside of the Company were identified based on the written agreement with the disposal company and the manifest  
 4. Since FY2021 incineration has been classified into two categories: with heat recovery and without heat recovery, and the hazardous category of incineration (without heat recovery) is 0.01 kt. To unify digits, it is shown as zero

Breakdown of Industrial Waste (in Japan) by Type of Waste



Emissions of Waste Plastic (FY2022)

GRI 306-3/306-4/306-5

Recycling of material and recycling, etc. (heat recovery) accounted for about 65% at directly controlled business sites and about 63% for the SMM Group as a whole. We will work to further reduce emissions and promote recycling.

	Directly controlled business sites		Group	
	Amount (t)	Details (%)	Amount (t)	Details (%)
Recycling	773.6	46.1	1,103.9	40.6
Recycling (Heat recovery)	325.4	19.4	613.2	22.6
Unused	Incineration (Without heat recovery)	262.0	34.6	263.4
	Landfill	318.2		736.4
<b>Total waste</b>	<b>1,679.1</b>	<b>100.0</b>	<b>2,717.0</b>	<b>100.0</b>

Education on the Environment

Environmental Education

Targeted employees	Environmental education activities	Purpose, contents
Business site general managers	• Education of newly-appointed business site general managers • Periodically send out information	• Promote understanding of the importance of the relationship between corporations and the environment and raise self-awareness and environmental awareness as the business site general manager • Provide information about revisions of laws and important precedents by a periodical e-mail magazine
Managers and supervisors	• Environmental e-learning (Environmental Laws, Basic)	• Understand the spirit and idea of Japan's laws, and understand Japan's mandatory and notification procedures
Internal auditors	• EMS Internal Auditor Training Course, standard update course	• Training of internal auditors for EMS with qualifications conforming to ISO 14001 (2015) and updating holders of old qualifications to the 2015 version
Managers	• Education about environmental preservation	• Provide information about the SMM Group's environmental preservation initiatives and raise self-awareness
Environment managers	• Conference for environment managers • Periodic education about the Chemical Substances Control Law	• Improve knowledge of Japan's environmental laws and regulations, enhance environmental management capabilities, raise self-awareness • Check the outline of Act on the Regulation of Manufacture and Evaluation of Chemical Substances and information on revisions, prevent omissions of notification, and raise self-awareness
Sales representatives	• Explanatory meeting: overseas chemical substance regulations	• Impart knowledge to sales representatives about overseas chemical substance regulations and raise their self-awareness
New and mid-career hires	• Education about environmental preservation for mid-career hires • Education about environmental preservation for new employees	• Impart knowledge about the SMM Group's environmental preservation initiatives and raise self-awareness

The SMM Group has established two e-learning courses on environmental laws with the objective of raising levels of compliance. Employees, especially managers and supervisors, involved with environmental laws and regulations, and internal environmental auditors, are taking part in those courses. The e-learning course on Japan's main environmental laws covers 10 laws that are deeply related to the businesses of the SMM Group and provides explanations of mandatory standards and notification procedures. As failing to comply with these requirements constitutes a violation of the law, employees must be certain to keep them in mind when conducting business. Given not only compliance with regulations and obligations, but also the voluntary risk management and information disclosure demanded of businesses today, the Group offers an e-learning course called Environmental Laws, Basic that serves as a stepping stone for properly conducting business. This course covers 12 laws, including the Basic Environment Act and the Basic Act on Biodiversity.

Laws Covered in the Environmental e-learning Courses

Name of law	Environmental Laws	Environmental Laws, Basic
Basic Environment Act	●	●
Basic Act on Biodiversity		●
Basic Act on Establishing a Sound Material-Cycle Society	●	●
Act on the Promotion of Environmental Conservation Activities through Environmental Education		●
Law Concerning the Promotion of Business Activities with Environmental Consideration		●
Act on Promotion of Global Warming Countermeasures		●
Act on the Rational Use of Energy	●	●
Air Pollution Control Act	● (including the content of the Act on Pollution Prevention Systems in Specified Factories)	●
Water Pollution Prevention Act	●	●
Soil Contamination Countermeasures Act	●	
PRTR Law	●	●
Poisonous and Deleterious Substances Control Act	●	
Waste Management and Public Cleansing Act	●	●
PCB Special Measures Law	●	
Act on Promoting Green Procurement		●



Significant Environmental Accidents / Biodiversity

Information Required to be Disclosed by GISTM

The information required to be disclosed by GISTM requirement 15.1 for two of the Group's tailings facilities, CBNC TSF3 and THPAL TSF1, which are classified as "very high" or "extreme" in terms of expected damage, is presented below.

Details of tailings facilities operated with "Extreme" or "Very high" potential consequences

Name of tailings facility		CBNC TSF3	THPAL TSF1																																																																																																
Operation		Coral Bay Nickel Corporation (CBNC)	Taganito HPAL Nickel Corporation (THPAL)																																																																																																
Country		Philippines	Philippines																																																																																																
Requirement 15.1B	1) A description of the tailings facility	Coral Bay Nickel Corporation (CBNC), hydrometallurgical processing plant in Rio Tuba at the southernmost tip of Palawan Philippines, commenced commercial operation to produce 10,000 tons of nickel per year from April 2005, and expand second processing line for its annual output to 20,000 tons of nickel in June 2009. Through High-Pressure Acid Leach (HPAL), nickel and cobalt in low-grade nickel laterite ore are leached using sulfuric acid and recovered as sulfides. After neutralized, tailings which are hematite and gypsum as predominant are discharged Tailings Storage Facility (TSF). CBNC TSF3 is about 1.5km north-east of the plant. The embankment of CBNC TSF3, which has one enclosed embankment on three sides excluding the western side is Rock-fill Dam with 32.0m of the maximum height, 42.0m a.s.l. of the crest. It is being built to full height in one stage with no further raises. The construction of the embankment commenced in October 2021, and is scheduled to be completed in February 2027. The cofferdam which has same structure as the embankment forms the south cell and the north cell in CBNC TSF3. The total impounding capacity is 16.5Mm <sup>3</sup> . Tailings discharged into the south cell commenced from January 2023.	Taganito HPAL Nickel Corporation (THPAL), hydrometallurgical processing plant located at Barangay Taganito, Claver, Surigao del Norte, commenced commercial operation to produce 30,000 tons of nickel per year from June 2013. Through High-Pressure Acid Leach (HPAL) same as CBNC, nickel and cobalt in low-grade nickel laterite ore are leached using sulfuric acid and recovered as sulfides. After neutralized, tailings which are hematite and gypsum as predominant are discharged Tailings Storage Facility (TSF). THPAL TSF1 is about 3.0km south-east of the plant. The embankment of THPAL TSF1 is Rock-fill Dam with 89.0m of the maximum height, 89.0m a.s.l. of the crest, and is designed in four stages raised by Downstream method. The 1st stage embankment was commenced to construct from April 2010, and the 3rd stage embankment, 75.0m a.s.l. of the crest, was completed to build in December 2022. The 4th stage of embankment will be commenced to build from April 2024 and be completed in June 2030. The total impounding capacity is 96.0Mm <sup>3</sup> . Tailings discharged into THPAL TSF1 started from June 2013. The Hillside Channel is along the entire perimeter of THPAL TSF1 to prevent rain runoff from entering inside its impoundment.																																																																																																
	2) The Consequence Classification	The Consequence Classification is rated as "VERY HIGH". The number of people potentially at risk from dam breach analysis is assumed to be over 100 and up to 1,000, as there are about 200 residences in the sphere of influence. There are no hospitals or schools in the impacted area. However, there is a national highway that crosses the flooded area, which may affect daily life and distribution.	The Consequence Classification is rated as "EXTREME". The number of people at risk from dam breach analysis is estimated to be over 1,000, as there are over 300 residences within the sphere of influence. There is one clinic in the impact zone, but no school. However, as there is a national highway that crosses the flood zone, it may affect daily life and distribution relations.																																																																																																
	3) A summary of risk assessment findings relevant to the tailings facility	Based on ANCOLD guidelines, CBNC TSF3 was designed to ensure stability by performing stability analysis using the predicted Maximum Credible Earthquake (The 10,000 year seismic event) for the dam classification (EXTREME). The results of this analysis and the design were verified by third-party verification. The flood discharge was also designed to be able to carry the "Maximum Probable Precipitation" (PMP) and "Probable Maximum Flood" (PMF), which were also validated by a third-party verification.	Based on ANCOLD guidelines, THPAL TSF1 was designed to ensure stability by performing stability analysis using the predicted Maximum Credible Earthquake (The 10,000 year seismic event) for the dam classification (EXTREME). The results of this analysis and the design were verified by third-party verification. The flood discharge was also designed to be able to carry the "Maximum Probable Precipitation" (PMP) and "Probable Maximum Flood" (PMF), which were also validated by a third-party verification.																																																																																																
	4) A summary of impact assessments and of human exposure and vulnerability to tailings facility credible flow failure scenarios	According to the results of the breach analysis, which assumes a forced dam breach, tailings will be released into the riverbed on the southeast side and flow downstream from the National Highway to the downstream riverbed area. As a result, it was assessed that approximately 200 residences along the national highway and around the riverbed area would be affected by flooding.	According to the results of the breach analysis, which assumes a forced dam breach, tailings will be released into the Hayanggabon River, and it was assessed that more than 300 residences would be affected by flooding. Note that 41 households residing directly downstream of the dam were relocated prior to the construction of the dam.																																																																																																
	5) A description of the design for all phases of the tailings facility lifecycle	<table border="1"> <tr> <td rowspan="3">Status</td> <td>Active</td> <td rowspan="3">Catchment area</td> <td>107 ha</td> </tr> <tr> <td>Operating on South Cell</td> <td>Impondment area</td> <td>75 ha</td> </tr> <tr> <td>Constructing on North Cell</td> <td>Impoundment Volume</td> <td>16.5 Mm<sup>3</sup></td> </tr> <tr> <td>Started inpondment</td> <td>Mar-2023</td> <td></td> <td></td> </tr> <tr> <td>Type</td> <td>Rockfill Dam</td> <td>Flood Criteria</td> <td>PMF (745 mm/day)</td> </tr> <tr> <td>Raising method</td> <td>N/A</td> <td>-Annual Exceedance Probability</td> <td></td> </tr> <tr> <td>Dam Hight</td> <td>32 m</td> <td>Seismic Criteria</td> <td>1/10,000</td> </tr> <tr> <td>Dam Elevation</td> <td>42 m</td> <td>-Annual Exceedance Probability</td> <td></td> </tr> <tr> <td>Downstream slope</td> <td>1:2.0</td> <td>Operational Basis Earthquake (OBE)</td> <td>0.15 g</td> </tr> <tr> <td>Upstream slope</td> <td>1:1.8</td> <td>Maximum Credible Earthquake (MCE)</td> <td>0.25 g</td> </tr> <tr> <td>Length of Embankment</td> <td>2,350 m</td> <td></td> <td></td> </tr> </table>	Status	Active	Catchment area	107 ha	Operating on South Cell	Impondment area	75 ha	Constructing on North Cell	Impoundment Volume	16.5 Mm <sup>3</sup>	Started inpondment	Mar-2023			Type	Rockfill Dam	Flood Criteria	PMF (745 mm/day)	Raising method	N/A	-Annual Exceedance Probability		Dam Hight	32 m	Seismic Criteria	1/10,000	Dam Elevation	42 m	-Annual Exceedance Probability		Downstream slope	1:2.0	Operational Basis Earthquake (OBE)	0.15 g	Upstream slope	1:1.8	Maximum Credible Earthquake (MCE)	0.25 g	Length of Embankment	2,350 m			<table border="1"> <tr> <td rowspan="3">Status</td> <td>Active</td> <td rowspan="3">Catchment area</td> <td>940 ha</td> </tr> <tr> <td>Operating in 3rd Stage</td> <td>Impondment area</td> <td>267 ha (4th Stage)</td> </tr> <tr> <td>Designing the 4th Stage (Final Stage)</td> <td>Impoundment Volume</td> <td>52.7 Mm<sup>3</sup> (up to 3rd Stage) 96.4 Mm<sup>3</sup> (up to 4th Stage)</td> </tr> <tr> <td>Started inpondment</td> <td>Jun-2013</td> <td></td> <td></td> </tr> <tr> <td>Type</td> <td>Rockfill Dam</td> <td>Flood Criteria</td> <td>PMF (1,549 mm/day)</td> </tr> <tr> <td>Raising method</td> <td>Downstream</td> <td>-Annual Exceedance Probability</td> <td></td> </tr> <tr> <td>Dam Hight</td> <td>89 m (4th Stage)</td> <td>Seismic Criteria</td> <td>1/10,000</td> </tr> <tr> <td>Dam Elevation 1st stage</td> <td>38 m</td> <td>-Annual Exceedance Probability</td> <td></td> </tr> <tr> <td>2nd stage</td> <td>60 m</td> <td>Operational Basis Earthquake (OBE)</td> <td>0.28 g (3rd Stage)</td> </tr> <tr> <td>3rd stage</td> <td>75 m</td> <td>Maximum Credible Earthquake (MCE)</td> <td>0.41 g (3rd Stage)</td> </tr> <tr> <td>4th stage</td> <td>89 m</td> <td></td> <td></td> </tr> <tr> <td>Downstream slope</td> <td>1:3.0</td> <td></td> <td></td> </tr> <tr> <td>Upstream slope</td> <td>1:3.0</td> <td></td> <td></td> </tr> <tr> <td>Length of Embankment</td> <td>1,217 m (3rd Stage) 1,476 m (4th Stage)</td> <td></td> <td></td> </tr> </table>	Status	Active	Catchment area	940 ha	Operating in 3rd Stage	Impondment area	267 ha (4th Stage)	Designing the 4th Stage (Final Stage)	Impoundment Volume	52.7 Mm <sup>3</sup> (up to 3rd Stage) 96.4 Mm <sup>3</sup> (up to 4th Stage)	Started inpondment	Jun-2013			Type	Rockfill Dam	Flood Criteria	PMF (1,549 mm/day)	Raising method	Downstream	-Annual Exceedance Probability		Dam Hight	89 m (4th Stage)	Seismic Criteria	1/10,000	Dam Elevation 1st stage	38 m	-Annual Exceedance Probability		2nd stage	60 m	Operational Basis Earthquake (OBE)	0.28 g (3rd Stage)	3rd stage	75 m	Maximum Credible Earthquake (MCE)	0.41 g (3rd Stage)	4th stage	89 m			Downstream slope	1:3.0			Upstream slope	1:3.0			Length of Embankment	1,217 m (3rd Stage) 1,476 m (4th Stage)		
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6) A summary of material findings of annual performance reviews and DSR (Dam Safety Review), including implementation of mitigation measures to reduce risk to ALARP	<p>CBNC TSF3: The following suggestions were received from the EOR.</p> <ul style="list-style-type: none"> <li>With regard to the spillway, periodic inspection and cleaning should be performed to prevent blockage and reduction of flow capacity due to accumulation of soil and rocks.</li> </ul> <p>[Action] Daily inspections of the Spillway and surrounding area are conducted once a day. If accumulated debris is found in the Spillway through visual inspection, they are immediately removed. The inspection of the surrounding area is conducted to find if there are sources of blockage. Sources like trees, hanging rocks, other materials that may fall and cause blockage are either removed or reinforced.</p>	<p>The following suggestions were received from the EOR.</p> <ul style="list-style-type: none"> <li>Upstream of THPAL TSF1, the topographic alteration due to mining is expected to increase the runoff coefficient (Larger PMF value), so the capacity of the flood discharge should be checked.</li> <li>In 2017, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) updated the Peak Ground Acceleration (PGA) in the Philippines to consider new findings, and since the design seismic coefficient THPAL have increased, the design seismic coefficient and dam stability need to be reconfirmed.</li> </ul> <p>[Action] Verification of the spillway's flow capacity and the stability of the dam in relation to the design seismic coefficient will be verified during the detailed design of the 4th Stage and reflected in the design.</p>																																																																																																	

Significant Environmental Accidents / Biodiversity

7)	A summary of material findings of the environmental and social monitoring programme including implementation of mitigation measures	A monitoring system for CBNC TSF3 embankment was designed in accordance with ICOLD and ANCOLD guidelines. Monitoring measured parameters are 1) pore water pressure within the core of the embankment, 2) pore water pressure within the foundation, 3) groundwater levels and quality seeping through the foundation, 4) subsurface lateral displacement and settlement, and 5) crest settlements. Effluent from CBNC TSF3 is sampled daily to monitor water quality to ensure that it meets the water quality standards set forth by the Department of Environment and Natural Resources (DENR) of the Philippines.	A monitoring system for THPAL TSF1 embankment was designed in accordance with ICOLD and ANCOLD guidelines. Monitoring measured parameters are 1) pore water pressure within the core of the embankment, 2) pore water pressure within the foundation, 3) groundwater levels and quality seeping through the foundation, 4) subsurface lateral displacement and settlement, and 5) crest settlements. Effluent from THPAL TSF1 is sampled daily to monitor water quality to ensure that it meets the water quality standards set forth by the Department of Environment and Natural Resources (DENR) of the Philippines.
8)	A summary version of the tailings facility EPRP (Emergency Preparedness and Response Plan) for facilities that have a credible failure mode(s) that could lead to a flow failure event	<p>Emergency Preparedness and Response Plan (EPRP) was established and is conducted according to its contents.</p> <p><b>1. Response to unusual operating condition</b> To detect unusual conditions through the monitoring and response different actions taken according to the procedure.</p> <p><b>2. Emergency Response Plan</b></p> <p>a) If an indication of an impending dam break is spotted or observed, the discoverer should report to the CBNC Manager and the Supervisor of the Environment Management and Quality Control Section (EMQCS). The Supervisor must proceed to the area immediately and identify an incident.</p> <p>b) For major incident, depending on the situation, make following instruction;</p> <ul style="list-style-type: none"> <li>• Inform the employees and officials of the downstream of the dam to take the emergency evacuation, conduct head count, and conduct search, and rescue under the supervision of the Disaster and Risk Management Committee (DRCM) if someone is missing.</li> <li>• CBNC General Affairs Dept. Manager and Community Relations Officers should immediately contact Local Government Units to inform them of the incident. Community Relations Officers should guide the community to designated evacuation sites around their area which is away from the flood routes.</li> <li>• Stop operation to reduce slurry volume discharge to the tailings dam and operate all pumps to reduce water level.</li> <li>• The Emergency Response Team (ERT) provide need equipment to be use in response to incident, and request contractors for additional equipment and/or manpower for response.</li> </ul> <p>c) Deploy a command center which is plant Manager, ERT and DRCM. The command center will be the disaster management at the sight where the emergency is unfolding can be best and safety overseen and is to evaluate the actual situation and that the necessary and appropriate action can be implemented or instructed.</p> <p>d) If every personnel and resident is evacuated and accounted, patrols at a safe distance are conducted to check and provide assistance and information to areas that have been affected.</p> <p>e) The situation should be reported to Government Entities within 24 hours.</p> <p>f) Provide assistance to rehabilitation and mitigation of impact and to the Disaster Management and Rehabilitation process.</p> <p><b>3. Information, Education and Communication</b> EMQCS shall coordinate with the Safety Section to plan the Dam break emergency action plan. Two sections shall disseminate this information in hand to all CBNC personnel. The Safety Section should ensure that the necessary materials for the emergency action plan are adequate and maintained. The Safety Section together with the Community Relations Section should ensure that the affected communities and their Local Government Unit (LGU) are well informed and educated about this scenario.</p> <p><b>4. Emergency Drill</b> Dam break emergency drill is conducted once a year.</p>	<p>Emergency Preparedness and Response Plan (EPRP) was established and is conducted according to its contents.</p> <p><b>1. Response to unusual operating condition</b> To detect unusual conditions through the monitoring and response different actions taken according to the procedure.</p> <p><b>2. Emergency Response Plan</b></p> <p>a) If an indication of an impending dam break is spotted or observed, the discoverer should report to the Manager and the Supervisor of Mine Environment Protection and Enhancement Office (MEPEO). The Supervisor must proceed to the area immediately and identify an incident.</p> <p>b) For major incident, depending on the situation, make following instruction;</p> <ul style="list-style-type: none"> <li>• Inform the employees and officials of the downstream of the dam to take the emergency evacuation, conduct head count, and conduct search, and rescue if someone is missing.</li> <li>• General Affairs Dept. Manager and Community Relations Officers should immediately contact Local Government Units to inform them of the incident. Community Relations Officers should guide the community to designated evacuation sites around their area which is away from the flood routes.</li> <li>• Stop operation to reduce slurry volume discharge to the tailings dam and operate all pumps to reduce water level.</li> <li>• The Emergency Response Team provide need equipment to be use in response to incident, and request contractors for additional equipment and/or manpower for response.</li> <li>• Cutoff national highway at designated point due to the possible flash flooding</li> </ul> <p>c) Deploy a command center at THPAL plant site and satellite centers at Taganito side and Hayanggabon side. The command center will be the disaster management at the sight where the emergency is unfolding can be best and safety overseen and is to evaluate the actual situation and that the necessary and appropriate action can be implemented or instructed. The satellite center will also serve as public communication sites for grievances, information dissemination, etc.</p> <p>d) If every personnel and resident is evacuated and accounted, patrols at a safe distance are conducted to check and provide assistance and information to areas that have been affected.</p> <p>e) The situation should be reported to Government Entities within 24 hours.</p> <p>f) Provide assistance to rehabilitation and mitigation of impact and to the Disaster Management and Rehabilitation process.</p> <p><b>3. Information, Education and Communication</b> MEPEO shall coordinate with the Safety Section to plan the Dam break emergency action plan. Two sections shall disseminate this information in hand to all CBNC personnel. The Safety Section should ensure that the necessary materials for the emergency action plan are adequate and maintained. The Safety Section together with the Community Relations Section should ensure that the affected communities and their Local Government Unit (LGU) are well informed and educated about this scenario.</p> <p><b>4. Emergency Drill</b> Dam break emergency drill is conducted twice a year.</p>
9)	Dates of most recent and next independent reviews	<p>A third party verified the dam stability and the spillway capability in July 2023. The design was identified to meet the Flood Design Criteria and the Seismic Design Criteria of GISTM.</p> <p>Multipartite Monitoring Team (MMT) which composed representatives from governmental agencies, local governments (municipalities and barangays), religious sectors, non-government organization and mining companies, etc., validate activities and monitoring data of Environmental Protection and Enhancement Program on every quarter. Next review will conduct in November 2023.</p>	<p>A third party assessed the dam stability in June 2020 and the spillway capability in July 2023. The design was identified to meet the Flood Design Criteria and the Seismic Design Criteria of GISTM.</p> <p>Multipartite Monitoring Team (MMT) which composed representatives from governmental agencies, local governments (municipalities and barangays), religious sectors, non-government organization and mining companies, etc., validate activities and monitoring data of Environmental Protection and Enhancement Program on every quarter. Next review will conduct in November 2023.</p>
10)	Annual confirmation that the Operator has adequate financial capacity to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the tailings facility and its appurtenant structures	Closure plan was established as Final Mine Rehabilitation and Decommissioning Plan (FMRDP) and submitted to Department of Environment and Natural Resources (DENR) of Philippine, and annual deposits is made to the FMRDP Fund.	Closure plan was established as Final Mine Rehabilitation and Decommissioning Plan (FMRDP) and submitted to Department of Environment and Natural Resources (DENR) of Philippine, and annual deposits is made to the FMRDP Fund.
Requirement 15.1C	Provide local authorities and emergency services with sufficient information derived from the breach analysis to enable effective disaster management planning	<p>Information, Education and Communication (IEC) activities with communities were held regularly for stakeholders and public audiences.</p> <p>Quarterly, the construction status of CBNC TSF3 and environmental monitoring results were explained to the members of MMT.</p>	<p>Information, Education, and Communication (IEC) activities with communities were held regularly for stakeholders and public audiences.</p> <p>Quarterly, the construction status of THPAL TSF1 and environmental monitoring results were explained to the members of MMT.</p>

Significant Environmental Accidents / Biodiversity

The following five requirements are not in conformance with both CBNC TSF3 and THPAL TSF1 and will be addressed within one year. Except for them, all requirements were confirmed to be in conformity.

The status of conformance for GISTM and the summary to address any gaps for CBNC TSF3 and THPAL TSF1

Requirement	Criteria	Progress and Further work	Term*
1.1	Conduct the human rights due diligence	Operations and activities are conducted based on the SMM Group Human Rights Policy in accordance with UNGP and are compiled to the Philippine Human Rights Laws and Regulations, but the human rights due diligence process regarding the tailings dam facilities has not been implemented. The human rights due diligence will be conducted through the process in accordance with the SMM Group Human Rights Policy, which was revised on June 1, 2022.	Within 1 year
5.7	For an existing tailings facility, seek to identify and implement additional reasonable steps that may be taken to further reduce potential consequences to people and the environment.	On design and construction phase, the design was adopted to minimize risks to people and the environment and the TSF was developed robust design. While, in the operation phase, additional reasonable steps to further reduce potential consequences have not been identified. For an existing tailings facility, the assessment and the frequency of its procedure based on the Dam Safety Review (DSR) should be involved to Tailing Management System (TMS).	Within 1 year
6.5	Establish the Change Management System	Through the TSF lifecycle, processes for identifying changes and processes for evaluation, review and approval have been done. A Change Management System has not been introduced including documentation as Deviance Accountability Report. A Change Management System will be established into the Tailings Management System.	Within 1 year
8.1	Publish the policy on or commitment to the safe management of tailings facilities	Sumitomo Metal Mining Group's Sustainability Policy was published, and its activity includes the safe management of tailings facilities. While the policy does not meet the Requirement sufficiently. The policy for the safe management of tailings facilities will be revised and published.	Within 1 year
13.2	Assess the capability of identified organizations to address emergency responses and improve a collaborative plan if gaps are identified.	Public sector agencies and local authorities and institutions that would participate in any emergency response have been identified, but the capacity of identified organizations has not been assessed. The assessment of the capacity to be supported by identified organizations in any emergency response will be conducted, and a collaborative response plan will be developed.	Within 1 year

\* Term fixed on August 5, 2023

## Environmental Data

### Effective Use of Non-Ferrous Metal Resources

Percentage of Recycled Input Raw Materials Used							GRI 301-2
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
Recycled raw materials and percentage used	SMM Group	kt (%)	249 (2.22)	227 (2.08)	229 (2.13)	239 (2.38)	<b>236</b> <b>(2.21)</b>

### Climate Change

Greenhouse Gas (GHG) Emissions							GRI 305-1/305-2
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>GHG Emissions (total)</b>	SMM Group	kt-CO <sub>2</sub> e	2,809	2,807	2,760	2,647	<b>2,823</b>
<b>Scope 1 (direct emissions)</b>			1,839	1,943	1,877	1,786	<b>1,965</b>
<b>Scope 2 (indirect emissions)</b>			971	865	882	861	<b>858</b>
<b>Emissions other than CO<sub>2</sub> included in Scope 1*</b>							<b>1,847</b>
Sulfur hexafluoride (SF <sub>6</sub> )			—	—	—	—	—
Hydrofluorocarbons (HFCs)			—	—	—	—	<b>630</b>
Methane (CH <sub>4</sub> )		t-CO <sub>2</sub> e	—	—	—	—	<b>149</b>
Nitrous oxide (N <sub>2</sub> O)			—	—	—	—	<b>0</b>
Nitrogen trifluoride (NF <sub>3</sub> )			—	—	—	—	<b>0</b>
Perfluorocarbons (PFCs)			—	—	—	—	<b>0</b>

Figures are rounded to the nearest whole number, so totals may not match  
Both Japan and overseas figures are calculated based on the GHG Protocol, and emission factors are based on the Japanese law "Act on Promotion of Global Warming Countermeasures"

GHG emissions factors for electric power purchased in Japan are the adjusted emissions factors of electric suppliers

For China and Taiwan, the latest emission factors published by the governments of those countries are used

For Vietnam, the default emission factor compiled by The Climate Registry (TCR) (2011 national emission factors published by the International Energy Agency (IEA) in 2013) is used

\* Disclosure from FY2022 based on the GHG Protocol

Energy and GHG Emissions Intensity Indices*							GRI 302-3/305-4
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Energy intensity index</b>	SMM Group	—	0.66	0.70	0.65	0.65	<b>0.62</b>
<b>GHG emissions intensity index</b>			0.65	0.67	0.63	0.64	<b>0.60</b>

\* Energy and GHG emissions intensity indices: The amount of energy and GHG emitted during the production of 1 ton of product, assuming the base year FY1990 value to be 1

### Significant Environmental Accidents / Biodiversity

Raw Material and Energy Inputs in Business Activities							GRI 301-1/301-2
Raw Material Input							
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Raw Materials (total amount)</b>	SMM Group	kt	13,334	13,116	12,777	11,936	<b>12,840</b>
Raw materials			10,979	10,646	10,524	9,808	<b>10,424</b>
Recycled materials*			249	227	229	239	<b>236</b>
Materials			2,106	2,243	2,024	1,889	<b>2,180</b>

Figures are rounded to the nearest whole number, so totals may not match

\* Does not include materials recycled within plants

Energy Input							GRI 302-1
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Energy Input (caloric value)</b>	SMM Group	TJ	32,586	32,052	31,728	30,651	<b>22,762</b>
Renewable energy			28	19	12	74	<b>66</b>
Non-renewable energy sources			32,558	32,033	31,716	30,577	<b>22,696</b>

From FY2022 onward, fuel, heat, electricity, etc. consumed in business activities in Japan and overseas are covered, and electricity consumption is converted into joules at 3.6 GJ per 1,000 kwh

### Water Resource Input, Water Discharge, and Water Consumption in Business Activities

Water Resource Input							GRI 303-3
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Water Withdrawal*</b>	SMM Group	ML	192,357	180,348	200,305	181,271	<b>197,186</b>
<b>Freshwater withdrawal</b>							
Surface water (rivers)			13,902	14,085	13,717	13,954	<b>15,321</b>
Rainwater			79	36	68	53	<b>44</b>
Groundwater			6,843	8,059	6,657	7,108	<b>7,586</b>
Industrial water (water from another organization)			14,444	14,293	14,339	14,437	<b>14,346</b>
Tap water (water from another organization)			404	407	393	417	<b>391</b>
<b>Seawater withdrawal</b>			156,686	143,468	165,132	145,301	<b>159,500</b>

Figures are rounded to the nearest whole number, so totals may not match

\* SMM uses the World Wide Fund for Nature (WWF) Water Risk Filter to determine and evaluate regions with high water stress. As a result of this, there are no areas of high water stress at SMM Group's production sites

Water Discharge							GRI 303-4
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Water discharge (total)</b>	SMM Group	ML	183,977	174,392	199,057	176,781	<b>196,736</b>
Seas*			183,060	173,456	198,051	175,753	<b>195,792</b>
Rivers			867	890	965	974	<b>879</b>
Sewerage, etc.			50	47	42	55	<b>65</b>

Figures are rounded to the nearest whole number, so totals may not match

\* Discharges into rivers flowing into enclosed seas are included in "Seas"

Water Consumption							GRI 303-5
	Scope	Unit	FY2018	FY2019	FY2020	FY2021	FY2022
<b>Total water consumption from all areas</b>	SMM Group	ML	8,615	6,195	4,281	4,917	<b>3,552</b>

Water consumption is estimated by subtracting the total water discharge from the total water withdrawal for each business site



Environmental Data

Release and Transfer of Chemical Substances in Business Activities

GRI 303-4/305-7

Scope		Unit	FY2018	FY2019	FY2020	FY2021	FY2022
Releases into the Atmosphere (total)		SMM Group	3,136	2,742	3,257	3,175	3,295
Releases into the atmosphere	SOx		1,608	1,376	1,733	1,739	1,715
	NOx		1,423	1,271	1,444	1,352	1,512
	Soot and dust		105	95	80	84	68
Discharge into Water (total)		SMM Group	71	68	64	59	65
Discharge into water	COD <sup>1</sup> (chemical oxygen demand)		56	55	49	48	49
	BOD <sup>2</sup> (biochemical oxygen demand)		15	13	15	12	16
Transfer/Release of PRTR Substances (total)		SMM Group	2,770	2,217	1,907	2,035	2,522
Transfer			2,670	2,120	1,822	1,958	2,438
Release	Release (total)		100	97	85	77	84
	Landfill (SMM premises)		3.2	2.7	0.8	0.8	0.8
	Soil		0.7	0.7	1.7	0.9	0.7
	Water		77.4	78.5	73.5	66.6	74.7
	Atmosphere		19.0	15.4	8.6	8.8	8.1

Figures are rounded to the nearest whole number, so totals may not match

1. COD (chemical oxygen demand): Measured for discharge into seas, including discharge into rivers flowing into enclosed seas

2. BOD (biochemical oxygen demand): Measured for discharge into rivers, excluding discharge flowing into enclosed seas

Final Disposal Amount of Industrial and Mining Waste in Japan

GRI 306-5

Scope		Unit	FY2018	FY2019	FY2020	FY2021	FY2022
Final Disposal Amount (total) <sup>1</sup>		SMM Group	86	71	52	60	74
Industrial waste			84.7	70.1	50.9	59.0	73.7
Mining waste <sup>2</sup>			0.9	0.8	0.7	0.7	0.7

1 Includes waste destined for landfills and incineration without heat recovery

2 Mining waste in the form of wastewater sludge generated by mine-affiliated Toyo Smelter & Refinery that is landfilled within the business site

Environmental Preservation-Related Investments in Capital Expenditures

Scope		Unit	FY2019	FY2020	FY2021	FY2022	FY2023 (plan)
Investments Related to Environmental Preservation (total)		SMM Group	5,385	6,071	7,718	12,180	18,856
Pollution prevention/ environmental preservation			5,244	5,715	7,549	11,694	18,446
Energy conservation			141	339	157	477	401
Percentage of environmental preservation-related investments to capital expenditures		SMM Group	10.6	17.3	11.9	8.6	9.5

Figures are rounded to the nearest whole number, so totals may not match

Rehabilitated Area

GRI 2-4/G4-MM1

Scope		Unit	A Total area of land developed but not rehabilitated (as of the end of FY2021)	B Area of land newly developed in FY2022	C Area of land newly rehabilitated in FY2022	D Total area of land developed but not rehabilitated (A+B-C)
Amount of land developed or rehabilitated (FY2022) <input checked="" type="checkbox"/>	SMM Group	Hishikari Mine	22	0	0	22
		Coral Bay Nickel	416 <sup>1</sup>	20	3 <sup>2</sup>	432
		Taganito HPAL	455 <sup>1</sup>	1	0 <sup>3</sup>	456

Figures are rounded to the nearest whole number, so totals may not match

1 Historical figures were reviewed and adjustments were made to prior periods

2 In addition to the rehabilitated area within the development site mentioned above, CBNC cooperated with the Philippine government, and proceeded with the rehabilitation of an additional 35 hectares in nearby regions outside the development site in FY2022, bringing the total certified rehabilitated area to 149 hectares (including bamboo groves) to date (Historical figures for off-site rehabilitated areas were reviewed and adjustments were made to prior periods)

3 In addition to the rehabilitated area within the development site mentioned above, THPAL cooperated with the Philippine government, and proceeded with the rehabilitation of an additional 59 hectares in nearby regions outside the development site in FY2022, bringing the total certified rehabilitated area to 600 hectares to date

Business Activities in Areas of High Biodiversity Value\*

GRI 304-1/G4-MM2

Currently, there are no projects in any region requiring the preparation of a management plan.

Scope		Unit	FY2022
Regions and production sites	Seto Island Sea	ha	62
	Philippines		583

Shisaka Smelting Co., Ltd. (production site) operates on Minoshima and Ienoshima islands, neighboring Setonaikai National Park. Neighboring areas equivalent to IUCN Category 2

Coral Bay Nickel Corporation (production site) operates on Palawan Island in hunting-prohibited and bird protection areas equivalent to IUCN Category 4

\* Areas classified as protected by the International Union for Conservation of Nature (IUCN) as Category 4 or higher and adjacent areas or areas with high biodiversity value that are considered equivalent (SMM's survey)

Areas classified as Category 1 are of highest priority